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The
Benjamin Smith Lyman
Collection

Given as a Memorial
to
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Northampton, Mass.
by
His Heirs

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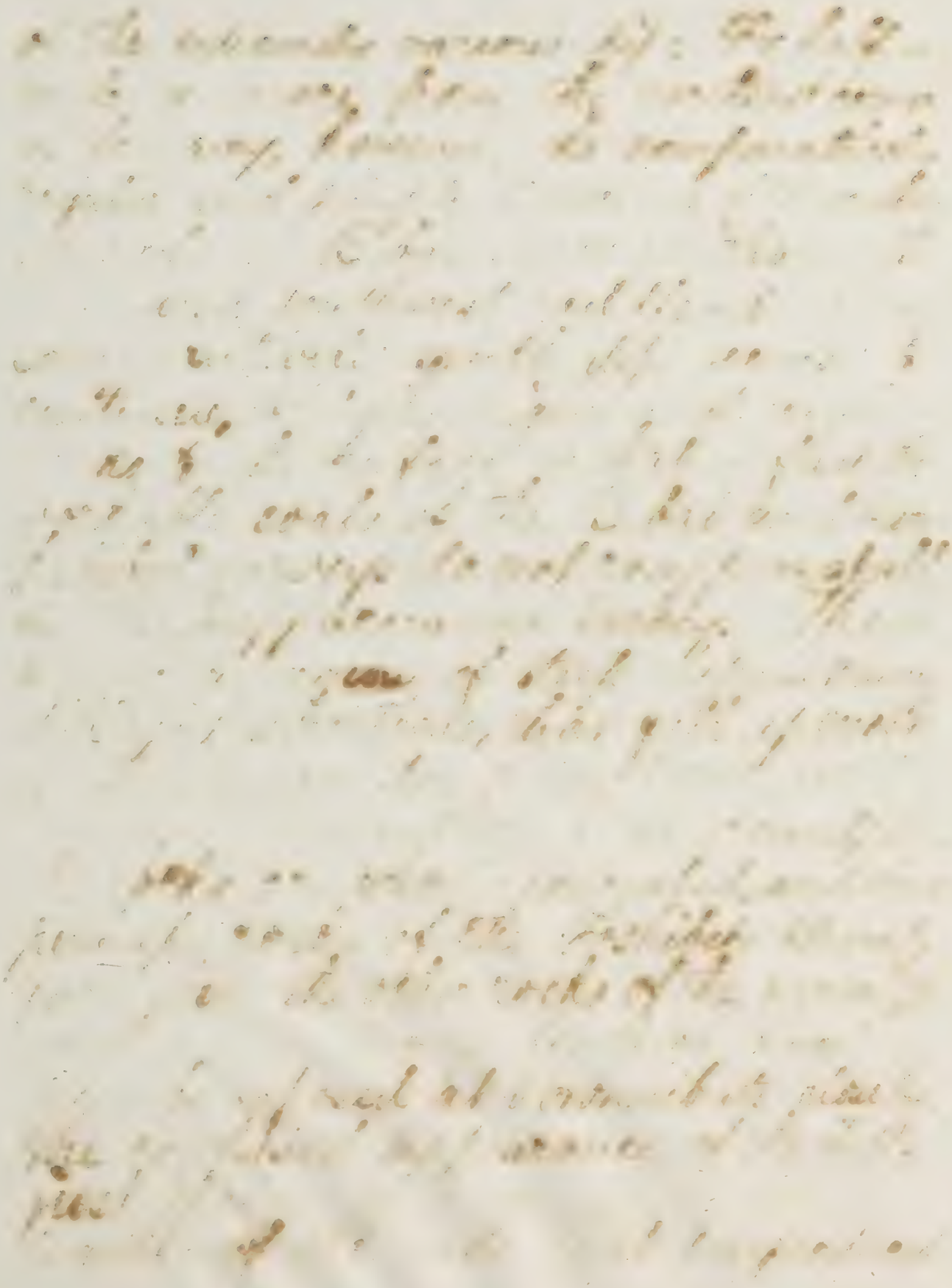
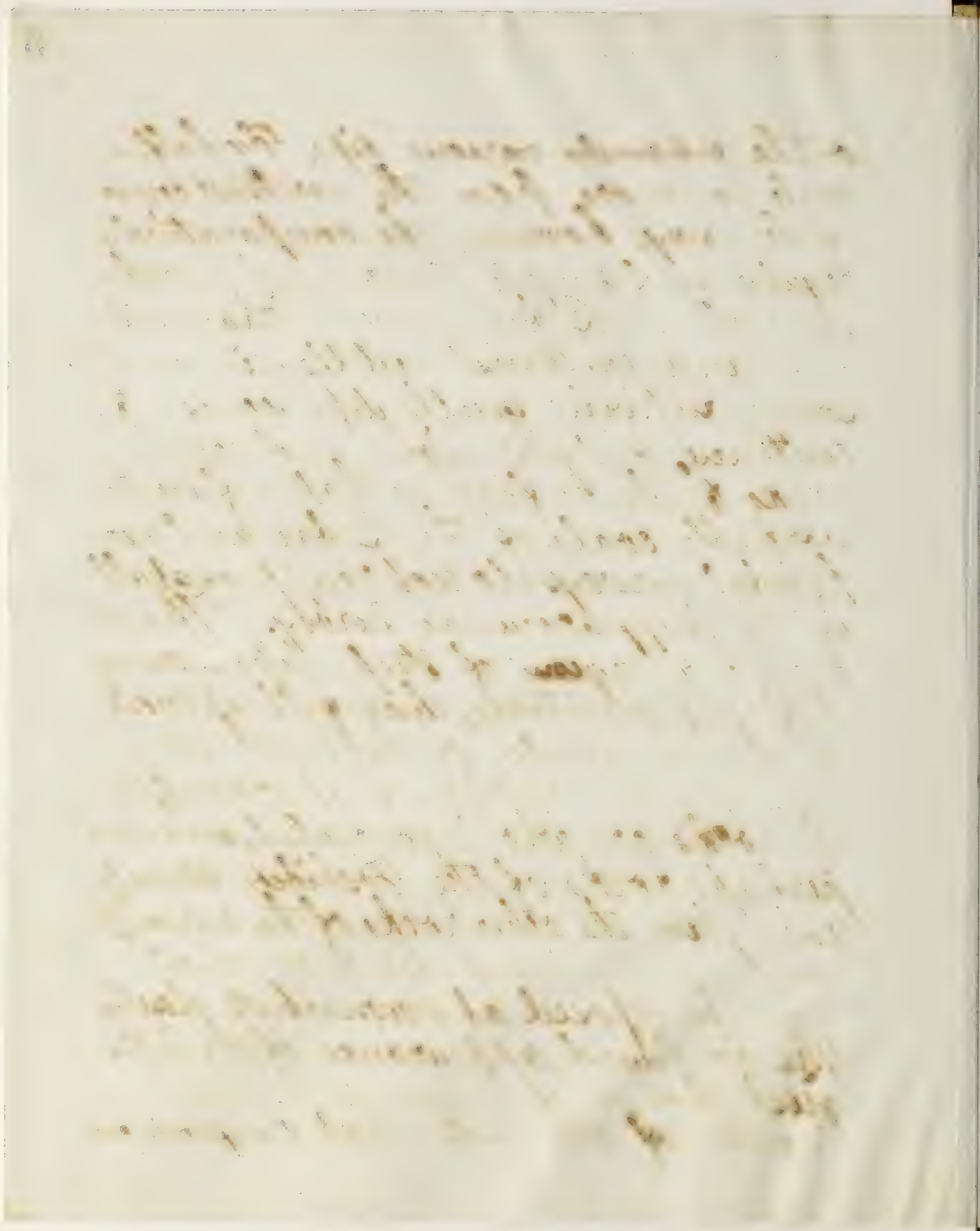
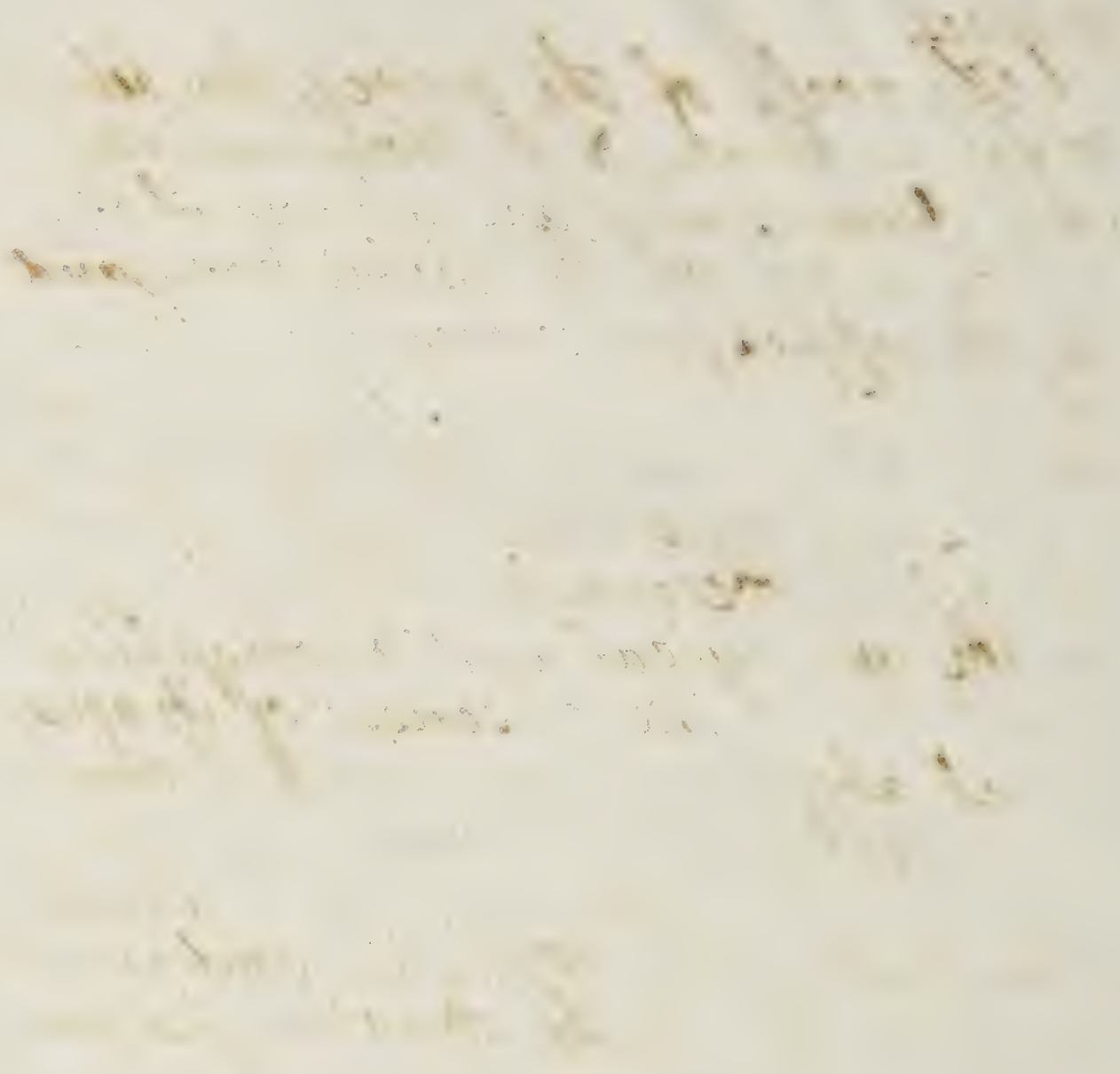
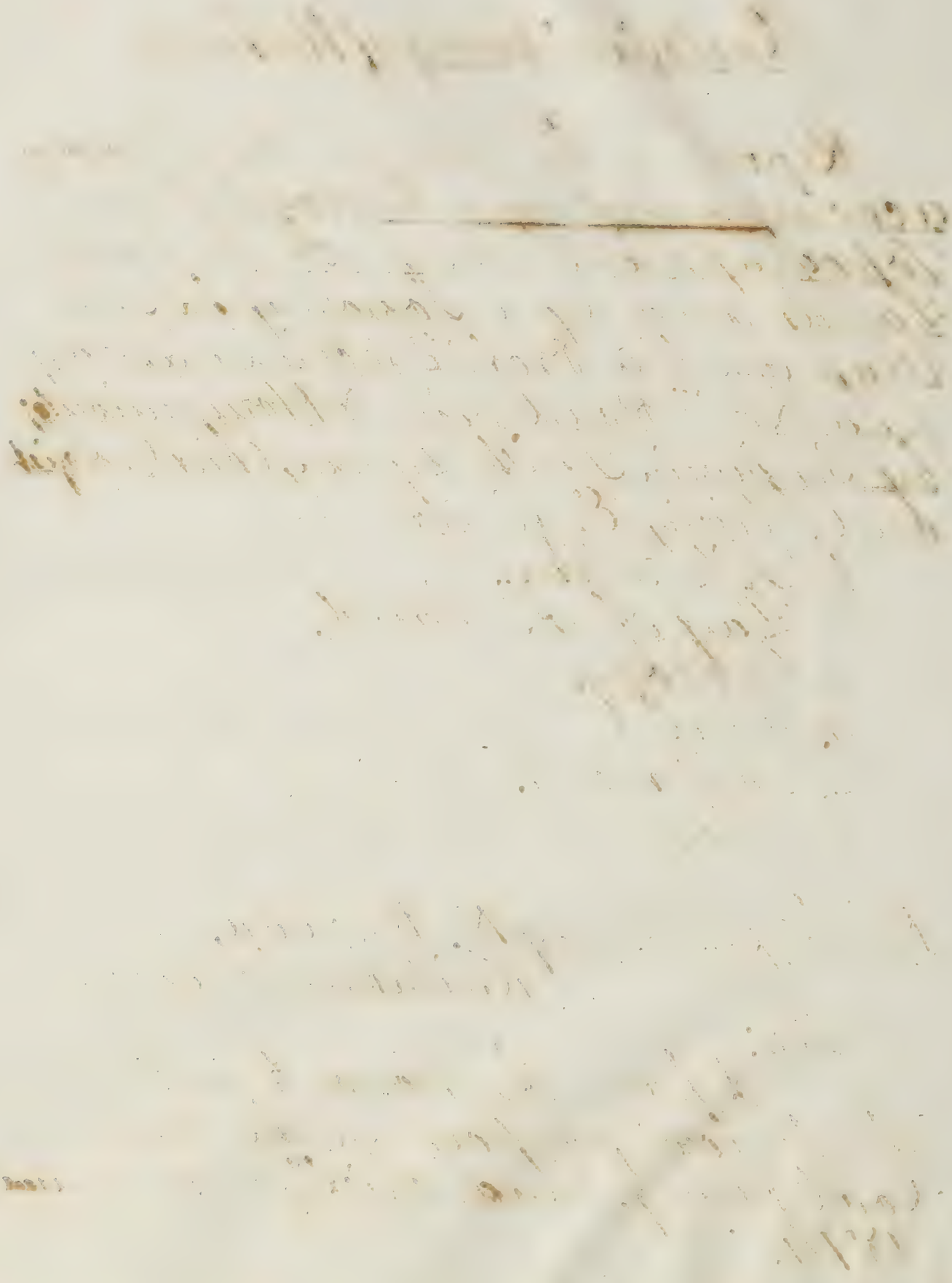








coal to the notice of the government, more than three years ago.

3. Geology.— The geological [illegible] through the greater part of the [illegible] has been very fully [illegible] and is in general very simple. The rock beds lie in the form of [illegible] saddle with [illegible] nearly northeast and southwest and falling away towards the northern [illegible] and the southwestern corner of the survey the highest point of the [illegible] near the northeastern corner of the survey [illegible] in the same direction. The dip [illegible] comparatively gentle (45° and less) on the northwestern side of the saddle, is but very steep (45° or more) on the other side. The plane of the axis then has a very marked inclination towards the northwest, and a line drawn along it at one level would [illegible] varying [illegible] of dip.

4. Quality [illegible] to a [illegible] capa[illegible]

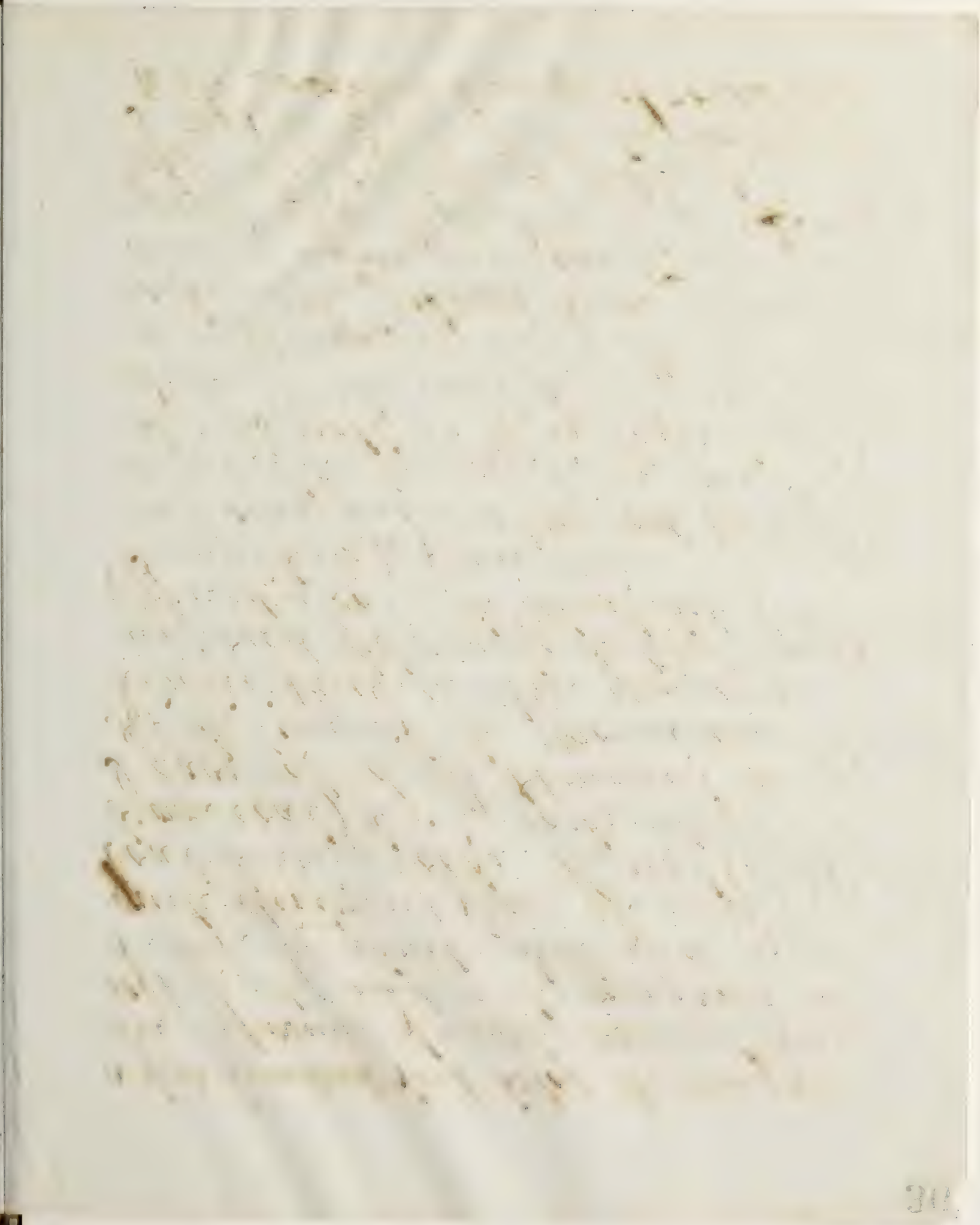
4. Coal. — With the exception

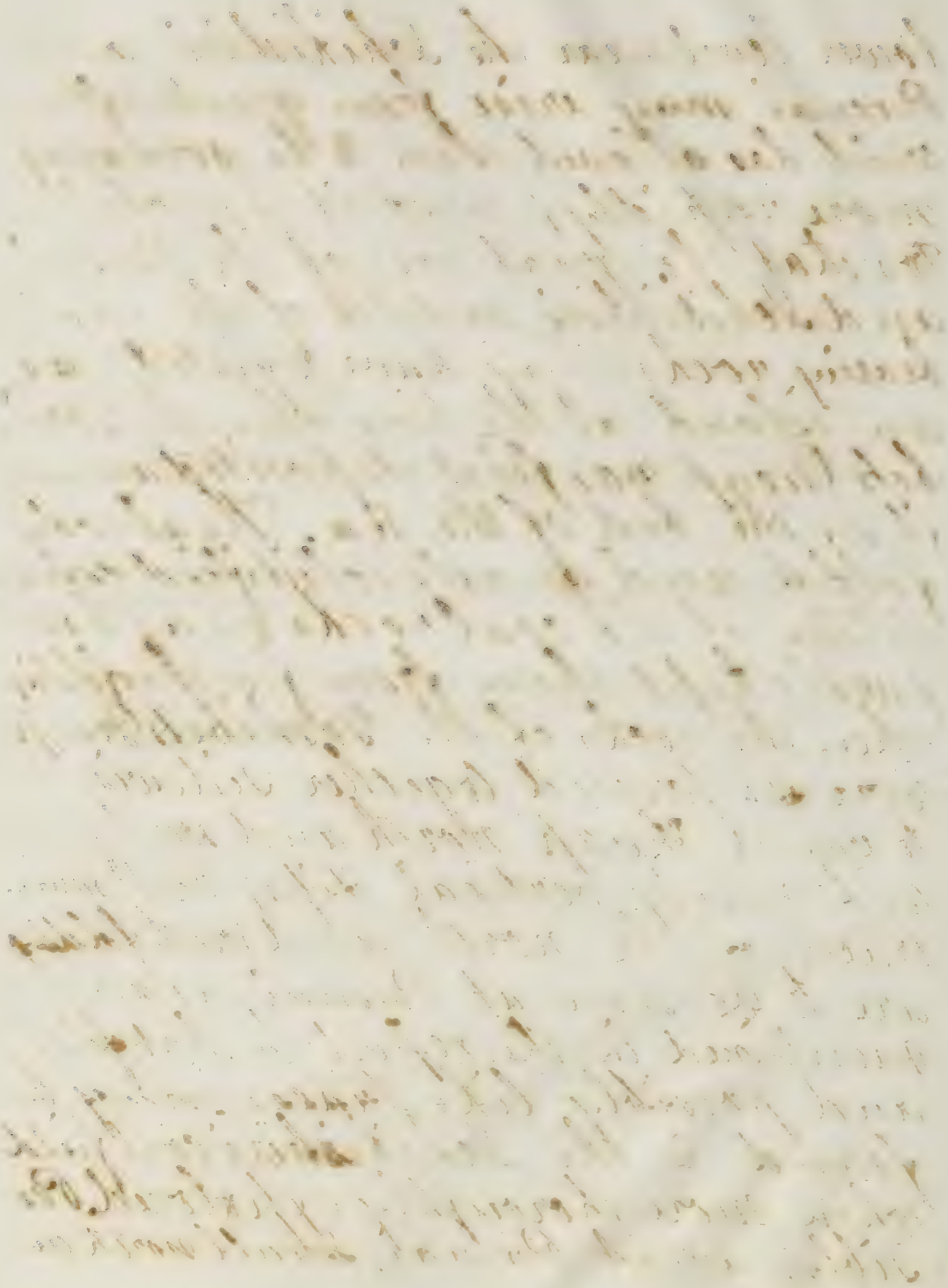
It is also exposed at one place in Sq. parwaucus and at one place in the [illegible] county and the [illegible] average [illegible] [illegible] is 2.94 feet.

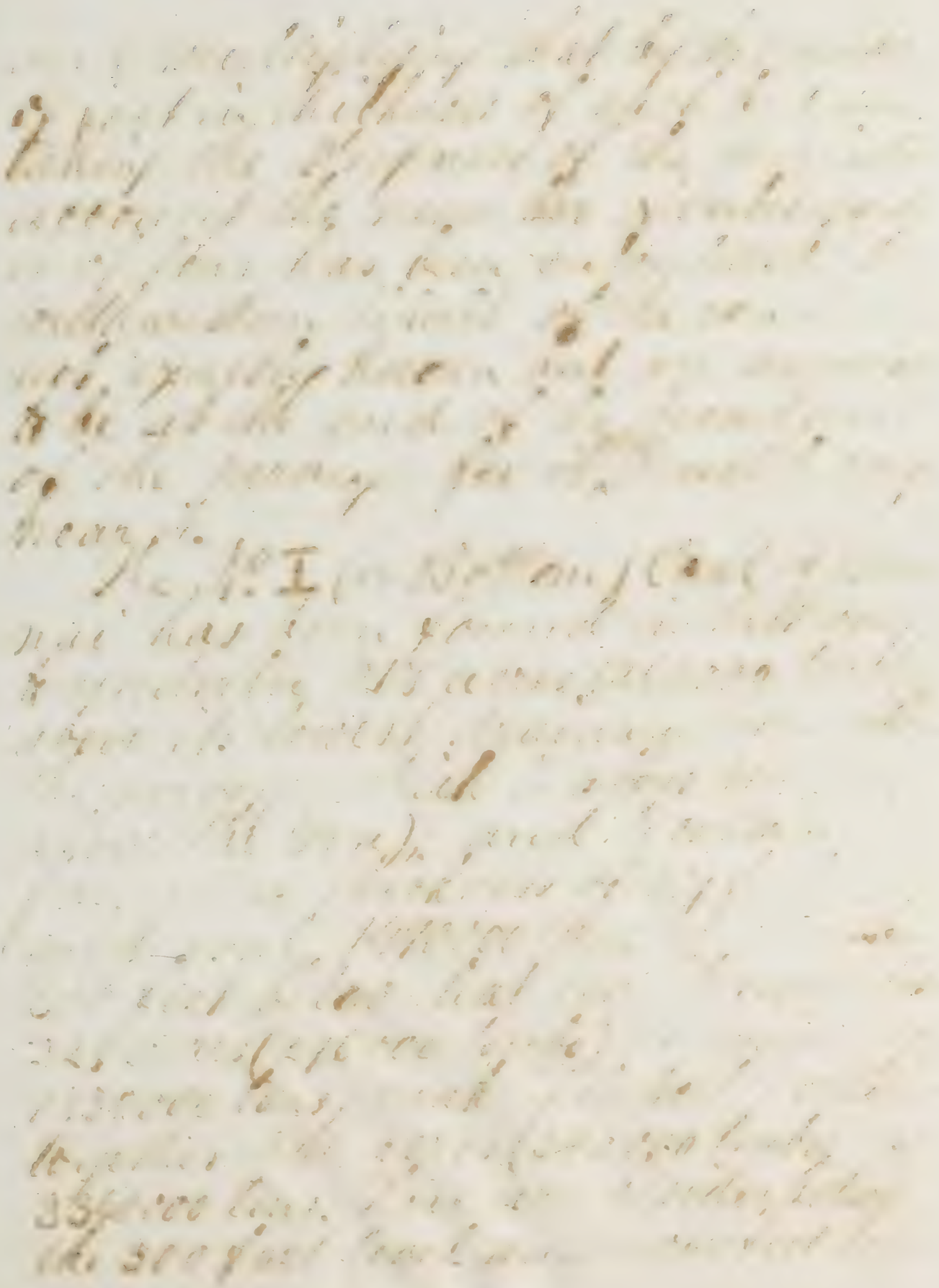
The No. IV Coal is the [illegible] [illegible] of which there appears from [illegible] [illegible] [illegible] with an average thickness of 5.79 [illegible] [illegible] and [illegible] [illegible] with an average [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

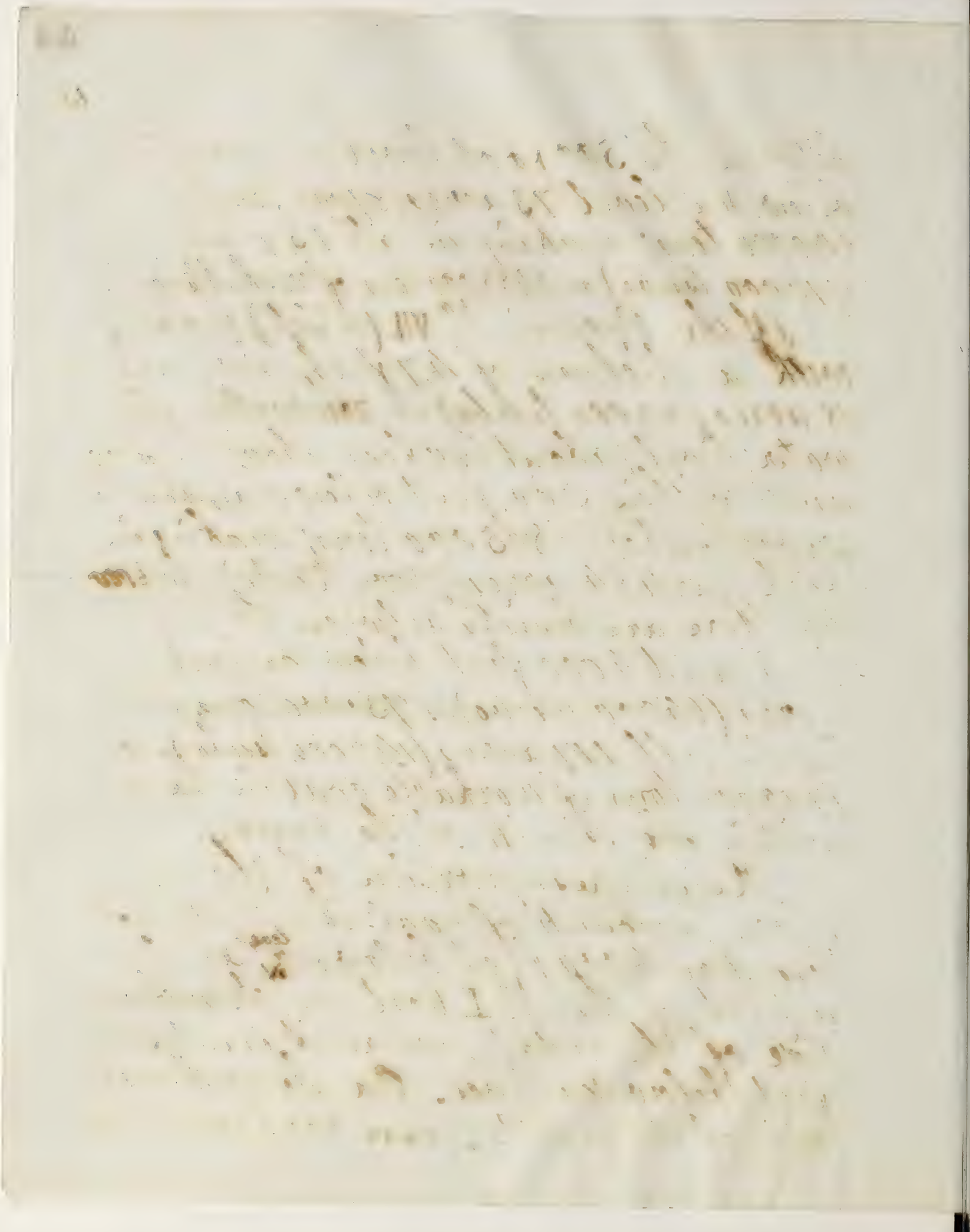
[illegible] V Coal [illegible] [illegible] [illegible] [illegible] at two other places [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

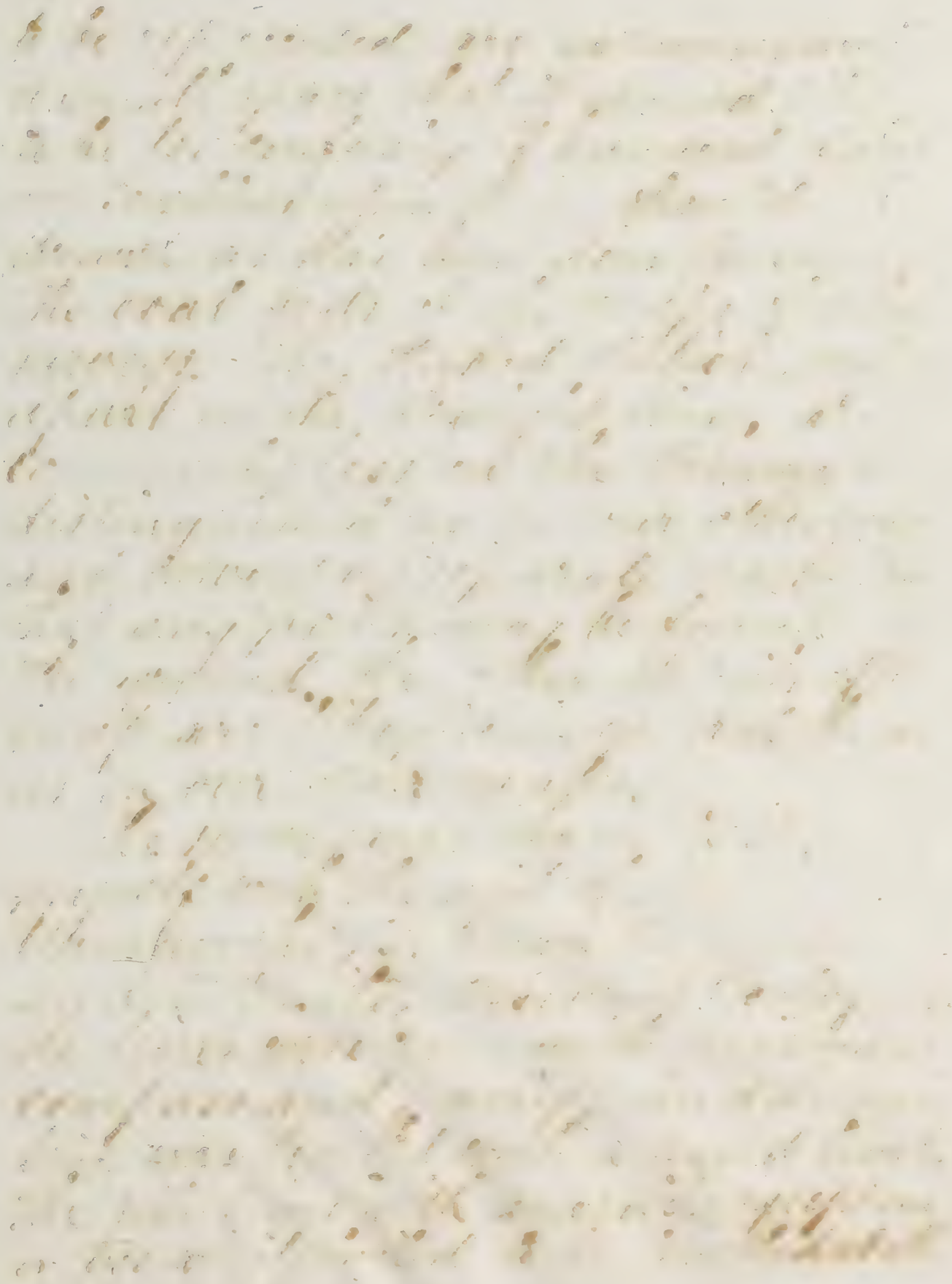
The No. VI Coal [illegible] [illegible] 376 [illegible] and is exposed [illegible] [illegible] [illegible] place in Poaguac with an [illegible] [illegible] [illegible] [illegible] 4.30 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

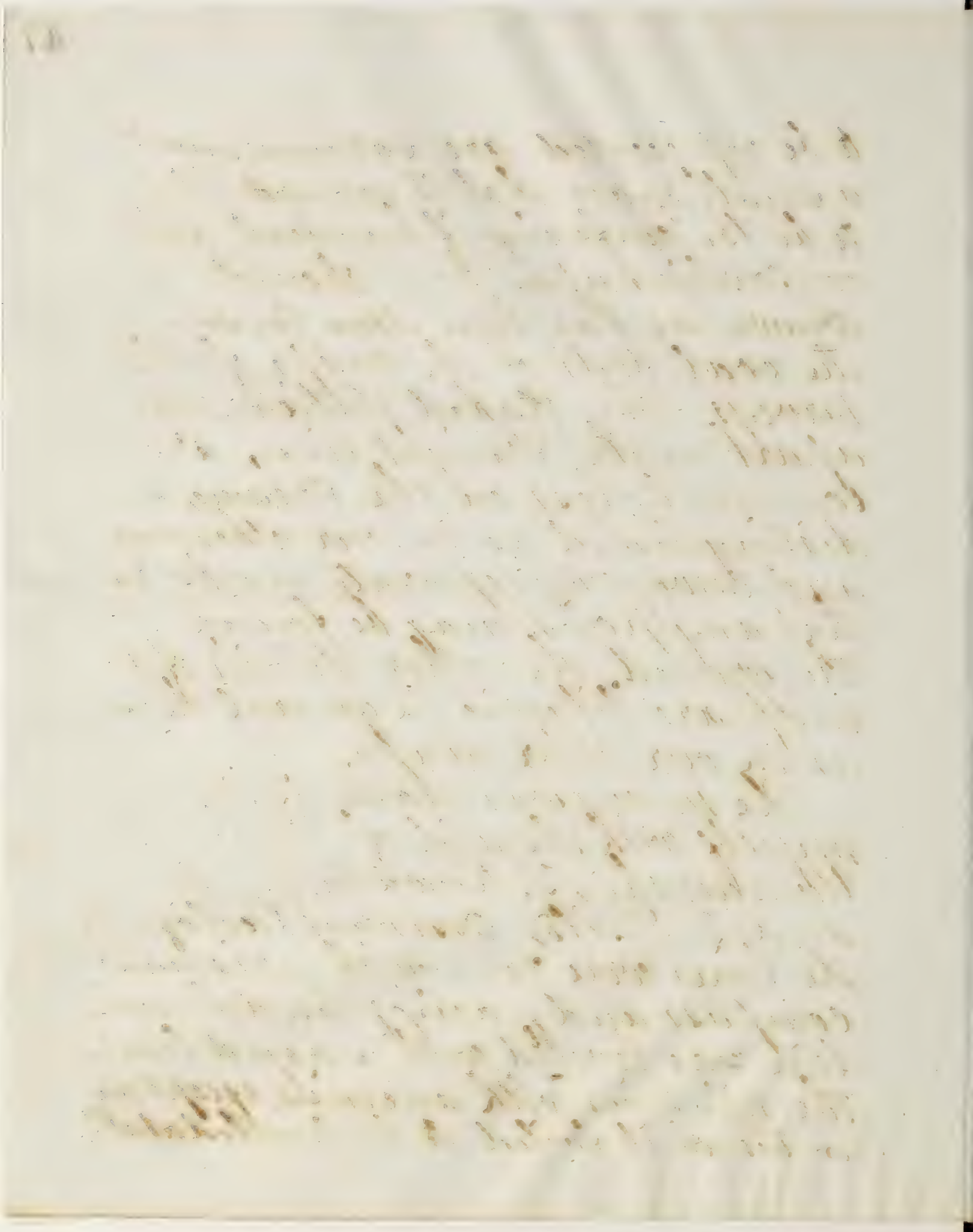












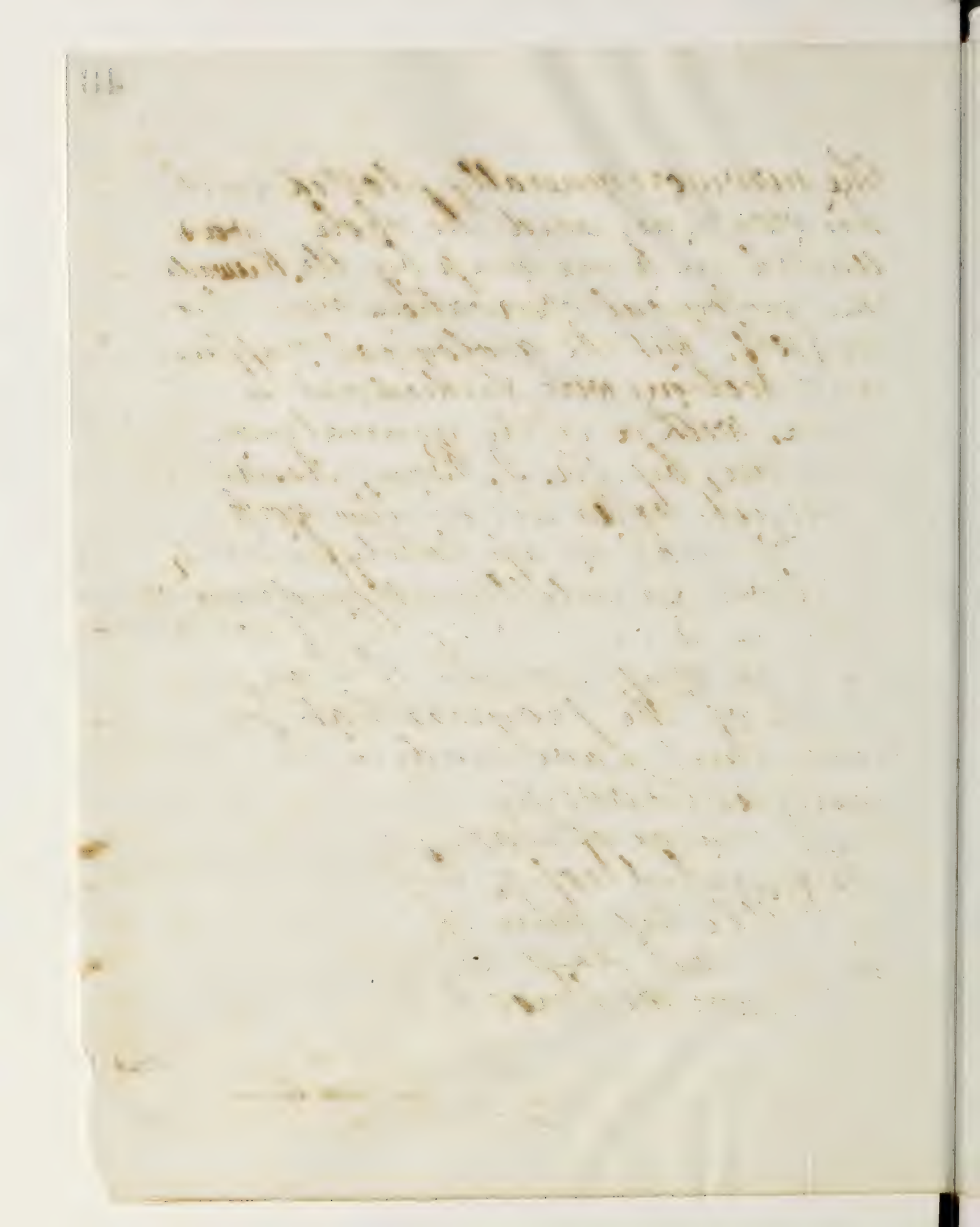
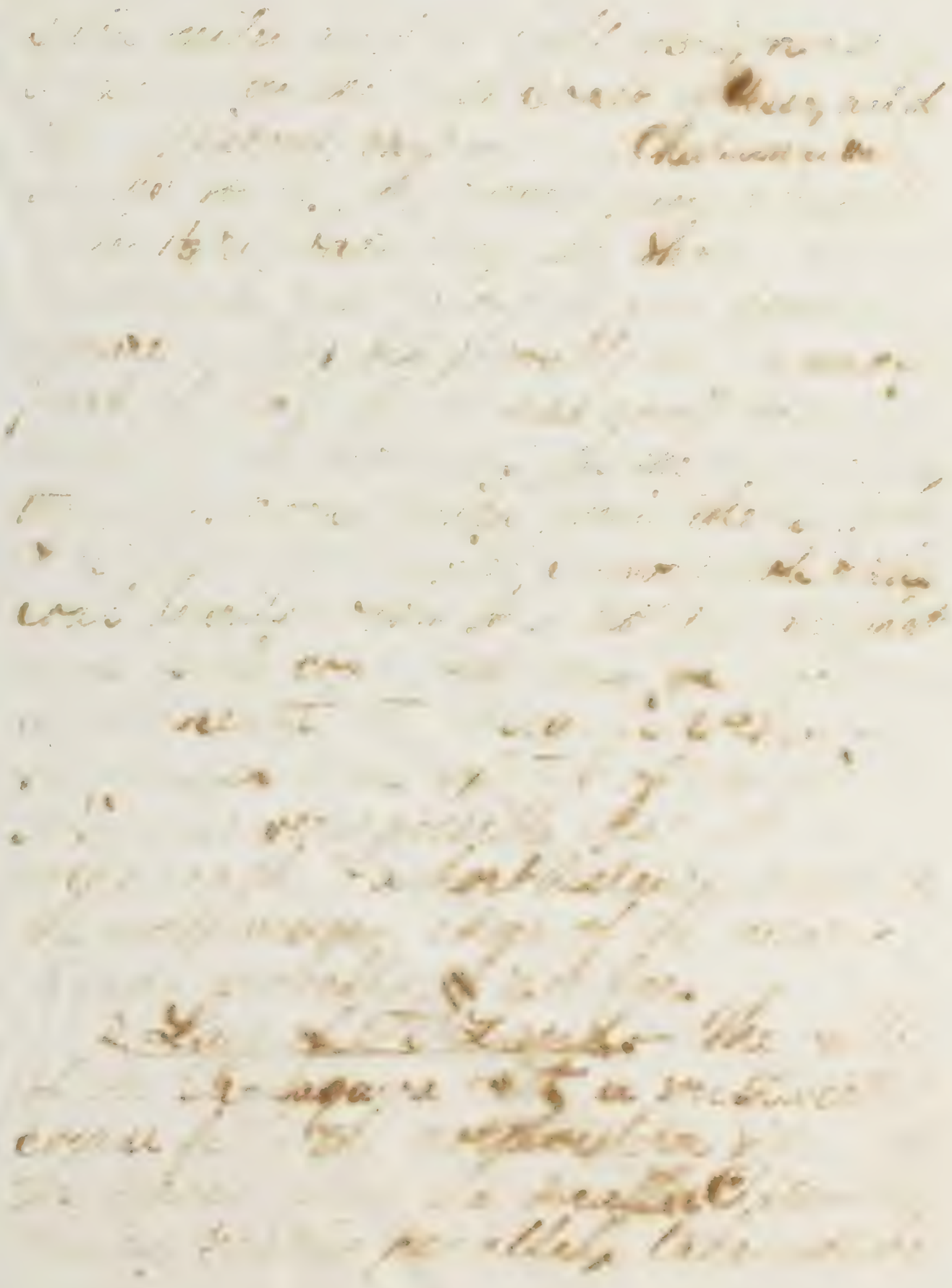
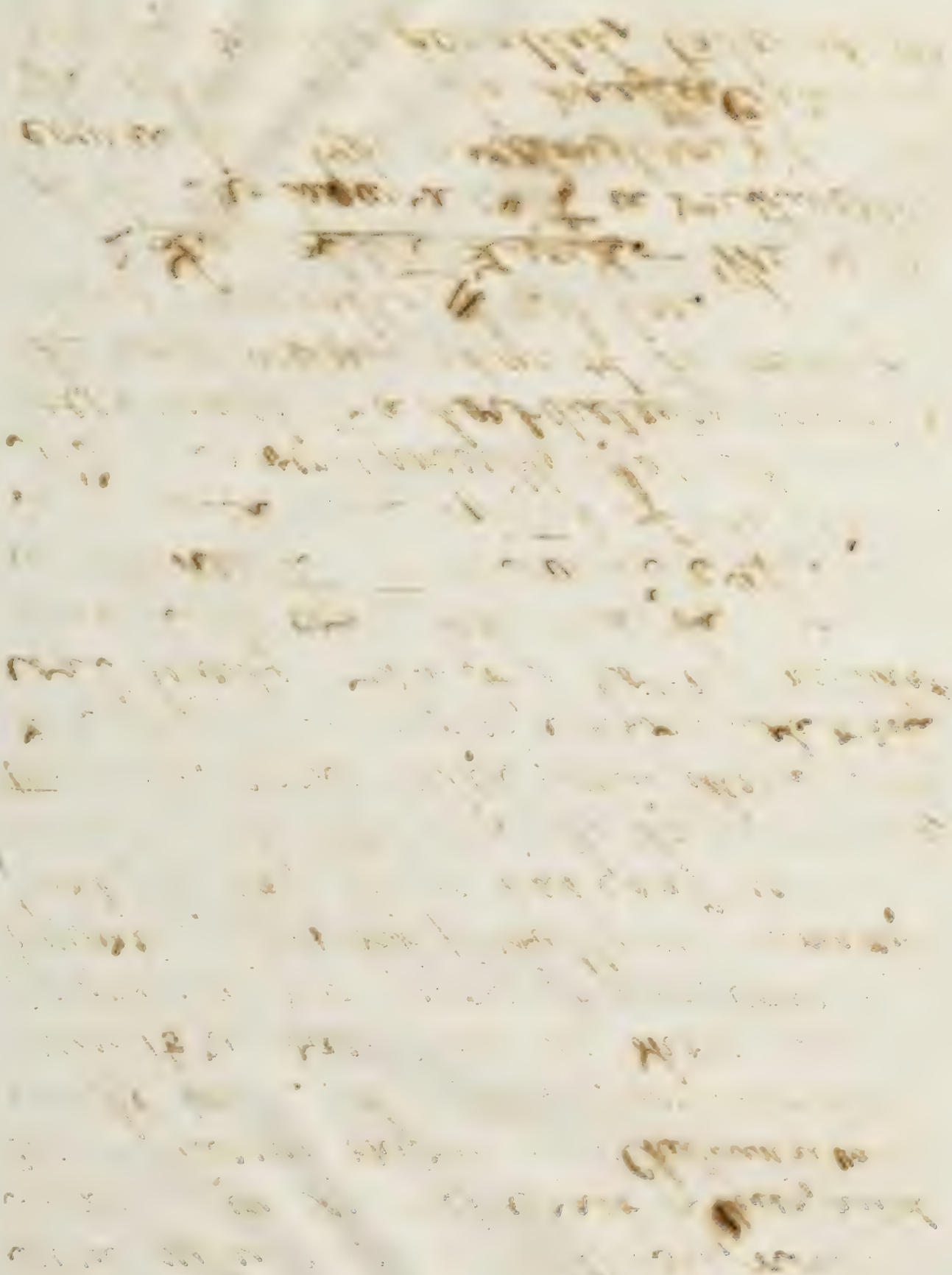
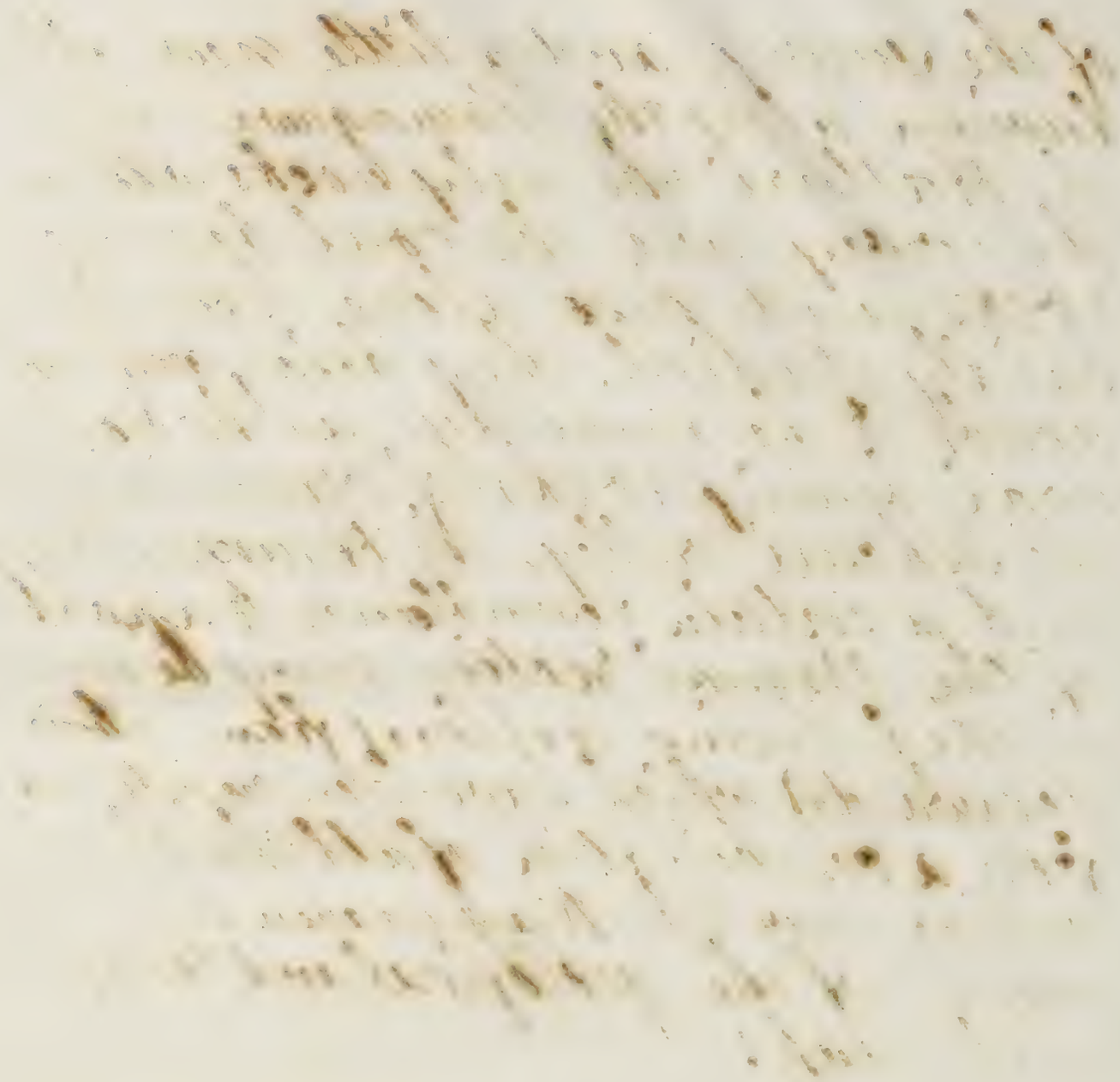


Fig. 280.





[illegible], there are [illegible] layers
[illegible] of little
[illegible], [illegible] and
[illegible] of [illegible]
[illegible] are
[illegible] small
[illegible] a few scattered
[illegible] along
[illegible]
[illegible]
[illegible]
[illegible], with a
[illegible] the [illegible]
[illegible]
[illegible]
[illegible]
[illegible] the [illegible]
[illegible] south west of
the [illegible] another,
[illegible] small branch of the
[illegible]gawa.
3. Geology. – The general [illegible]
structure of the coal bearing [illegible]
[illegible] to be very simple; [illegible] to be

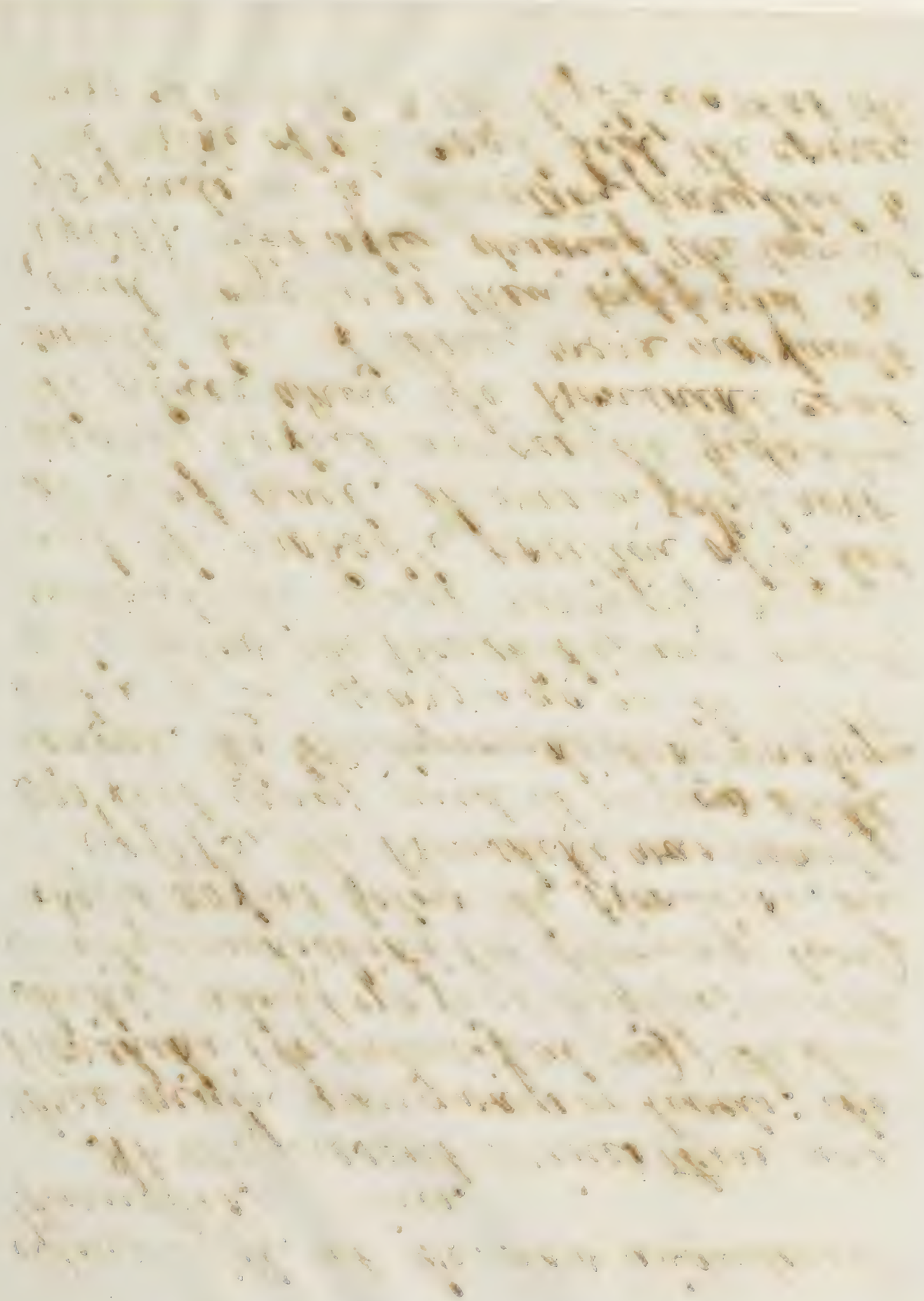


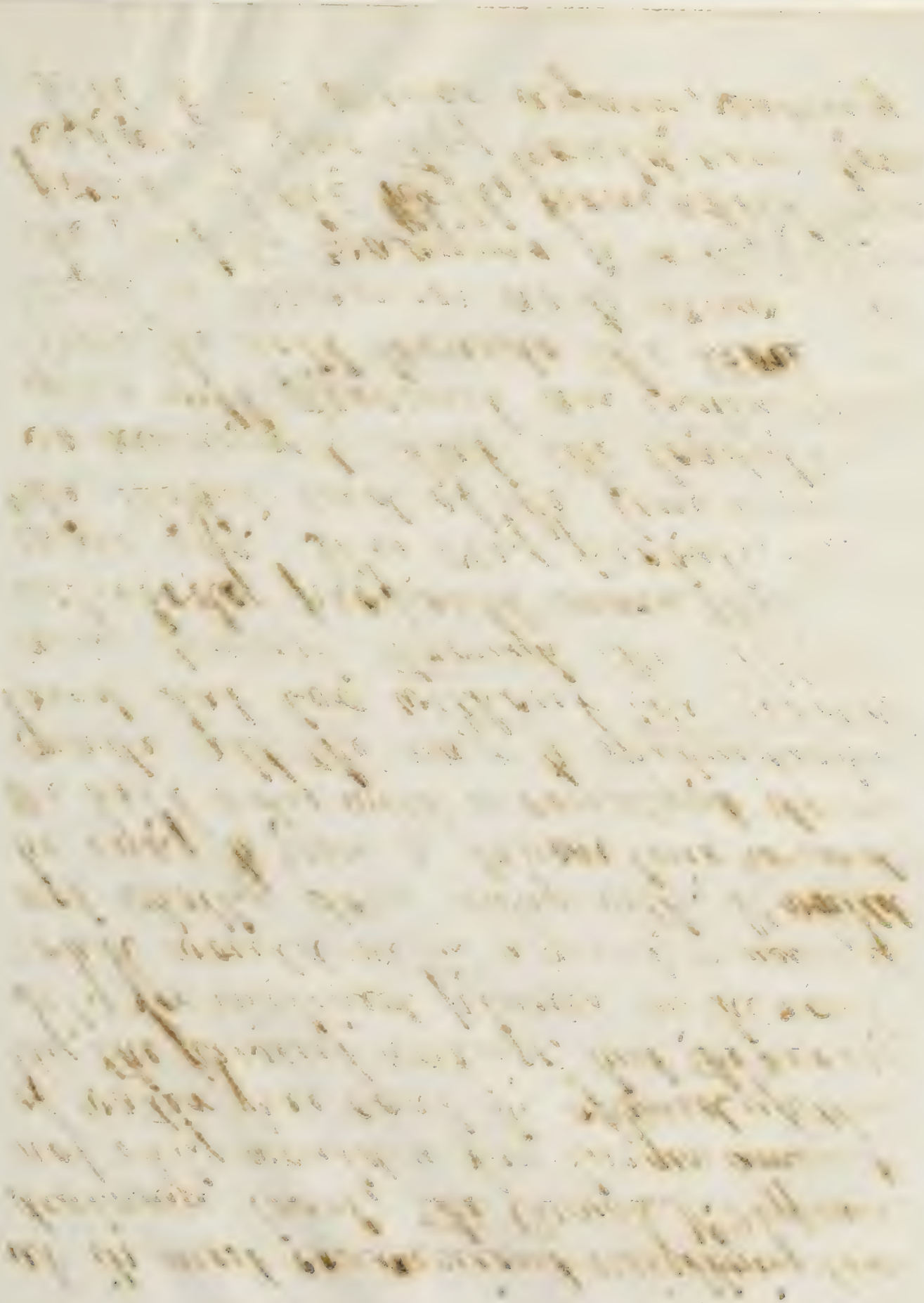
The eagle.

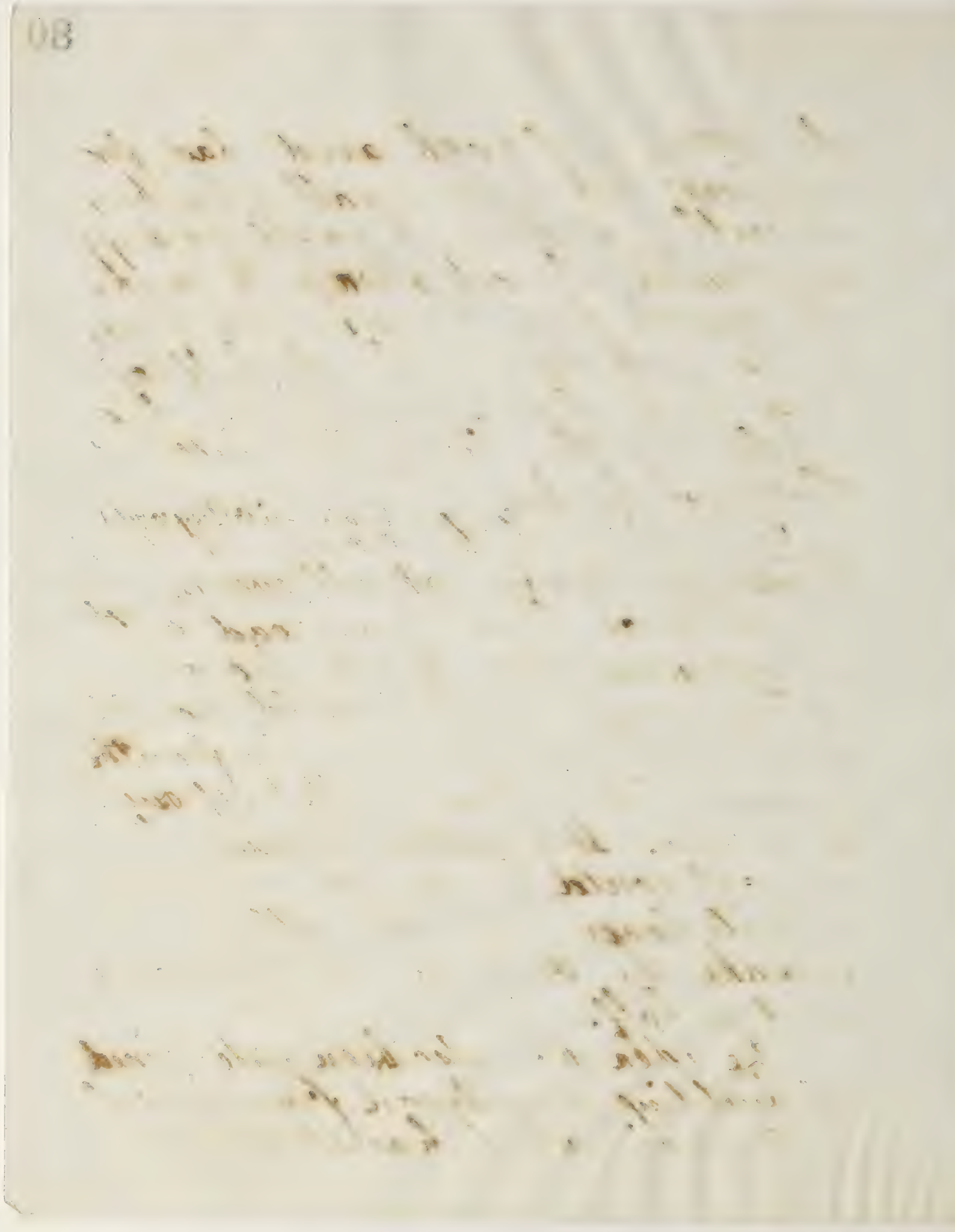
Chataunai saddle, and running back inland on the southerly side of the saddle, ~~[illegible]~~ past the exposure of Coal No. [illegible]. The details are more fully shown on the map of the coal field.

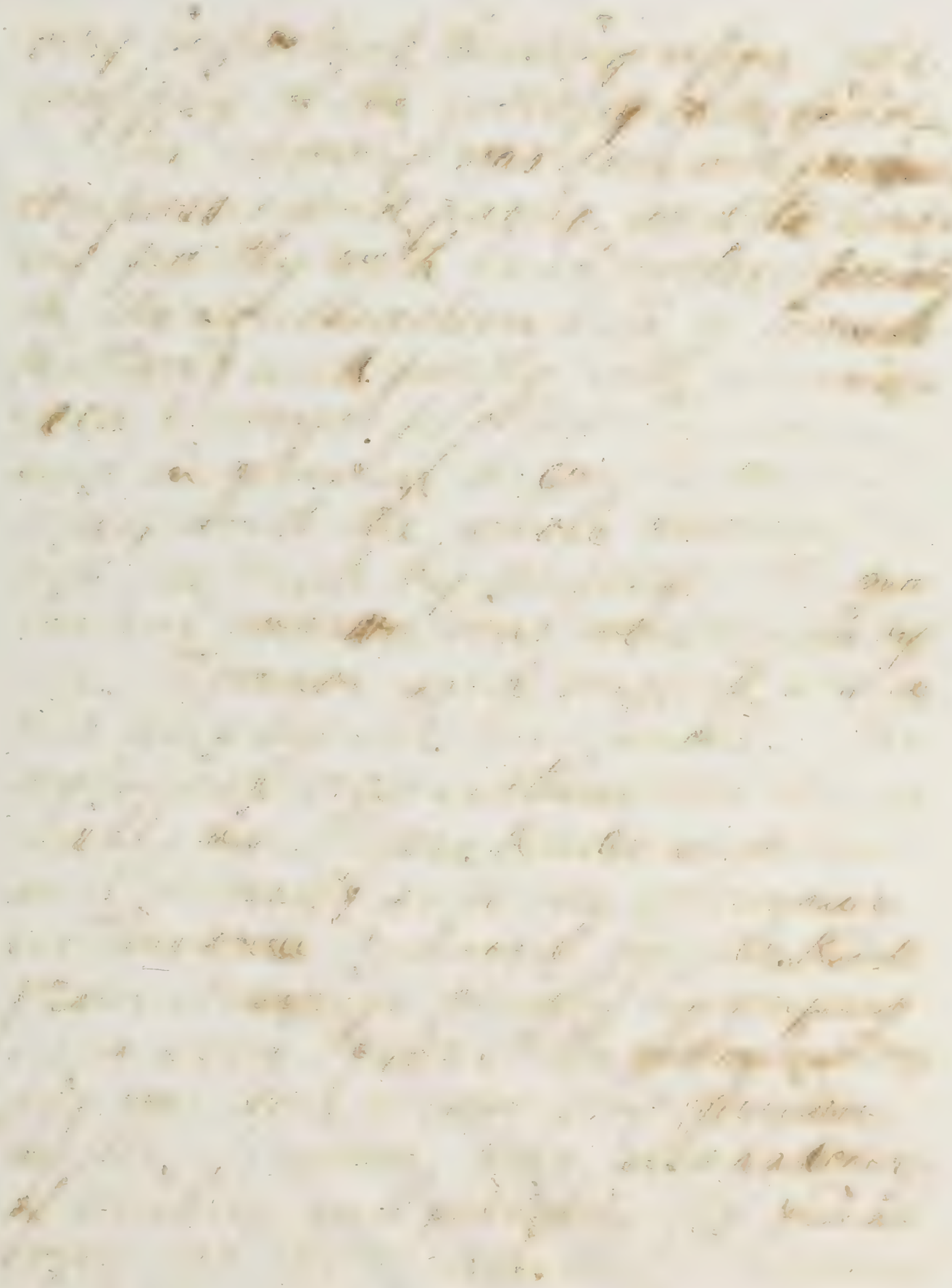
The present map was [illegible] the extent of certain portions of the several coal beds to be measured, taking account of their thickness and of the steepness of their dip, the cubic contents have been calculated and the weight in tons accompanying [illegible] to the map. In order not to exaggerate the amount of available coal only small portions of each seam that may be most safely considered to have a commercially workable thickness have been measured; but the Coal No. 1 on account of its less variable thickness, has been measured over a wider extent. It is not unlikely however that the beds may prove in fact to be workable through a much wider space, especially in some of the less [illegible]

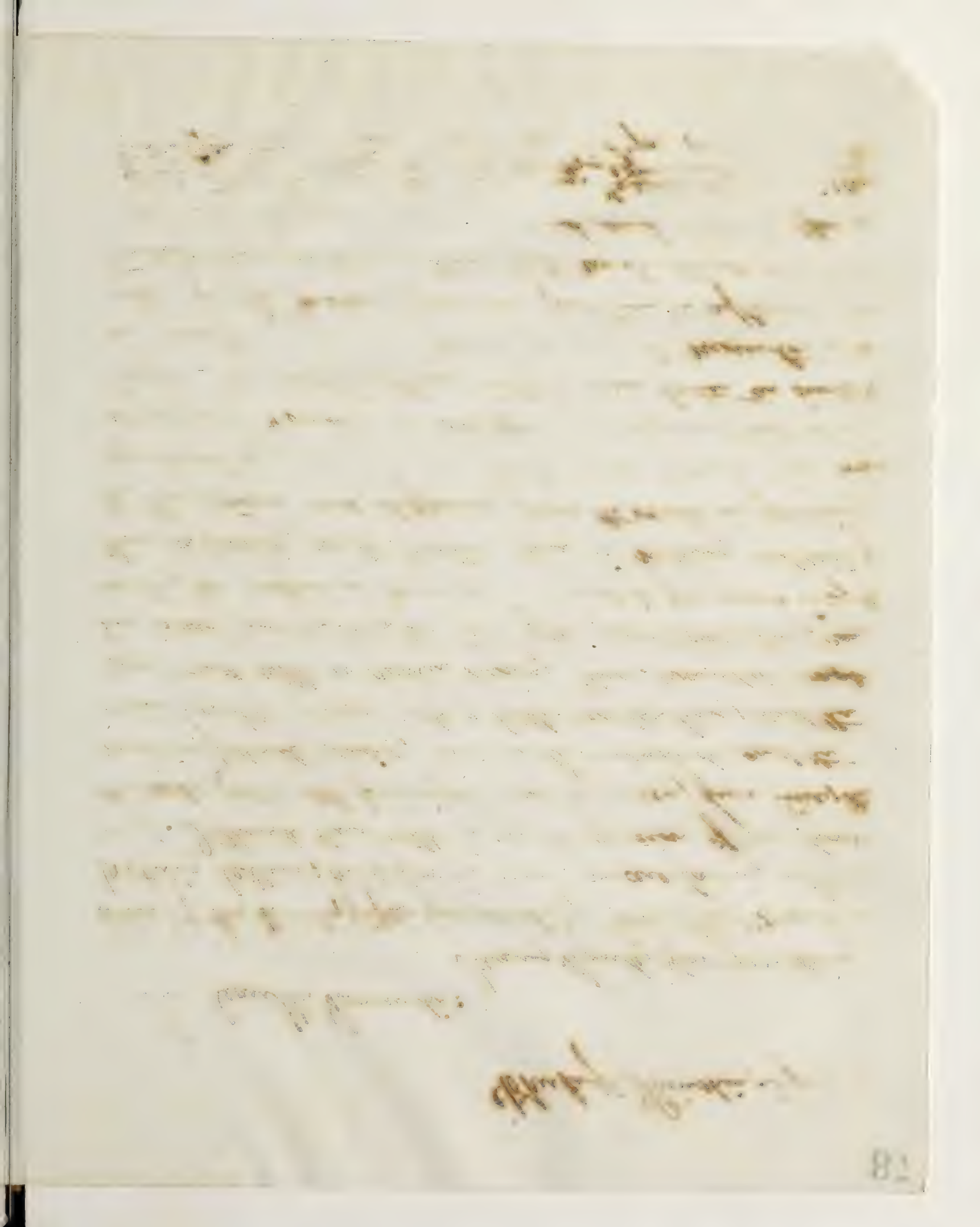
320000 tons.

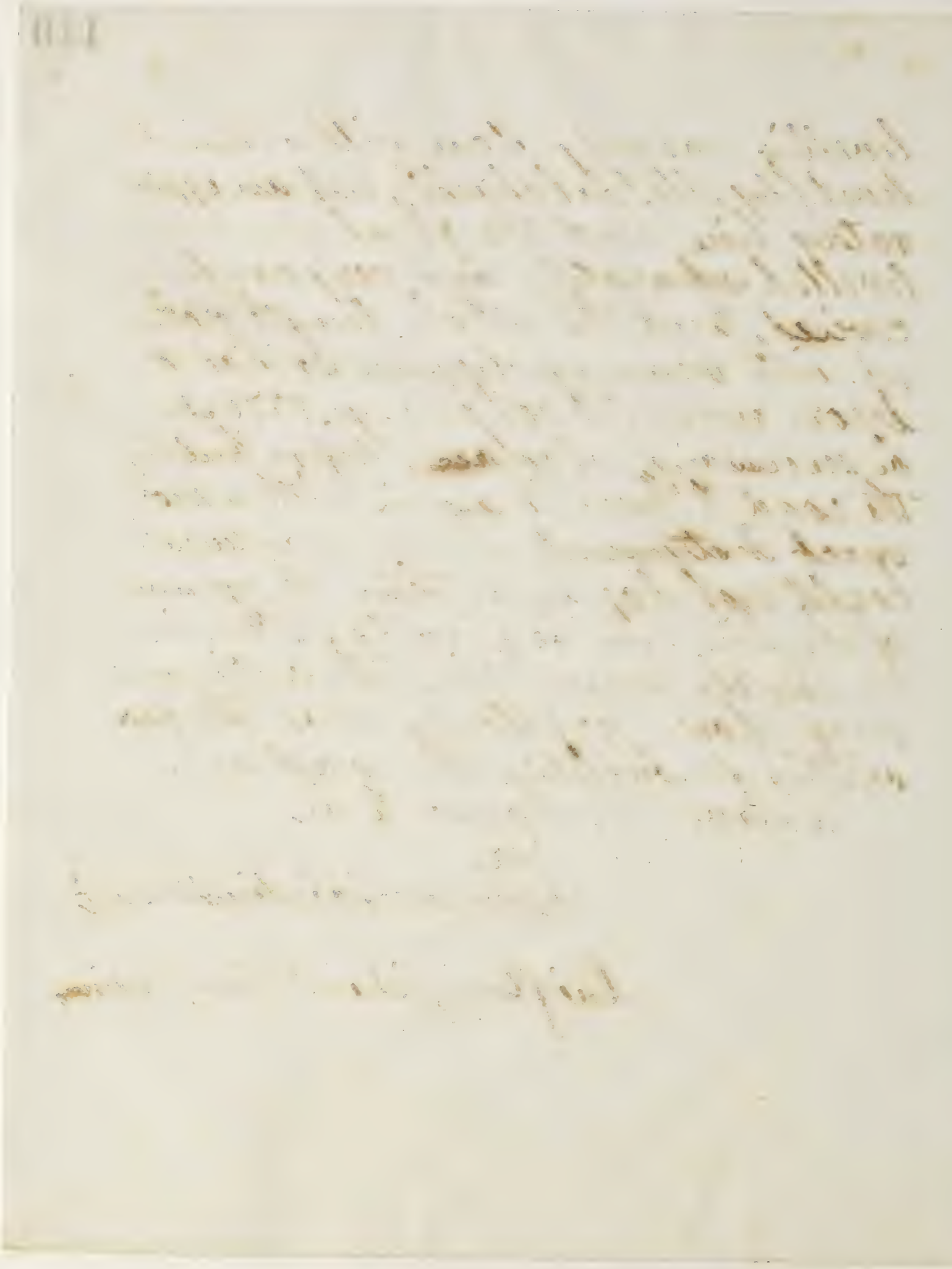


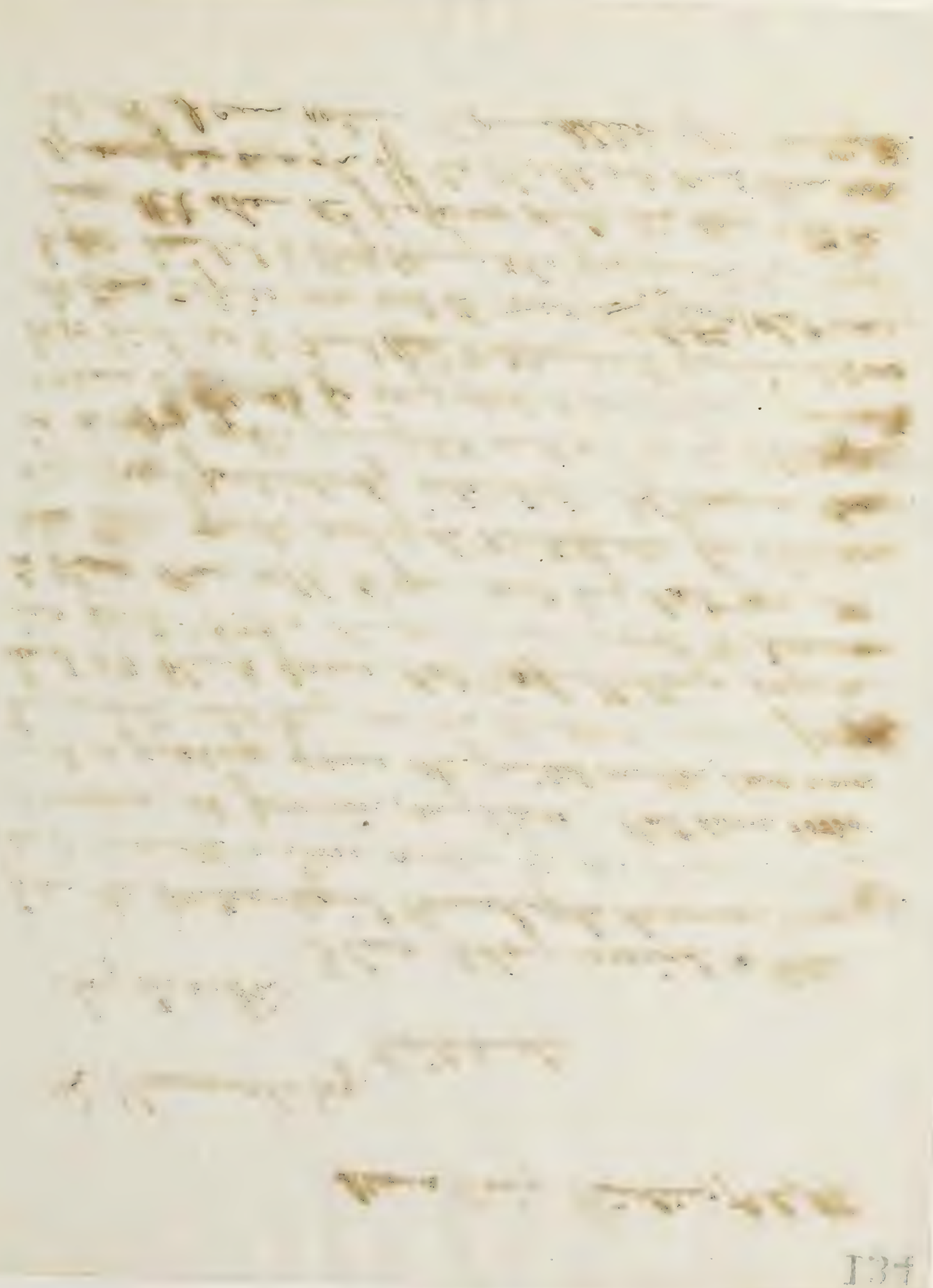


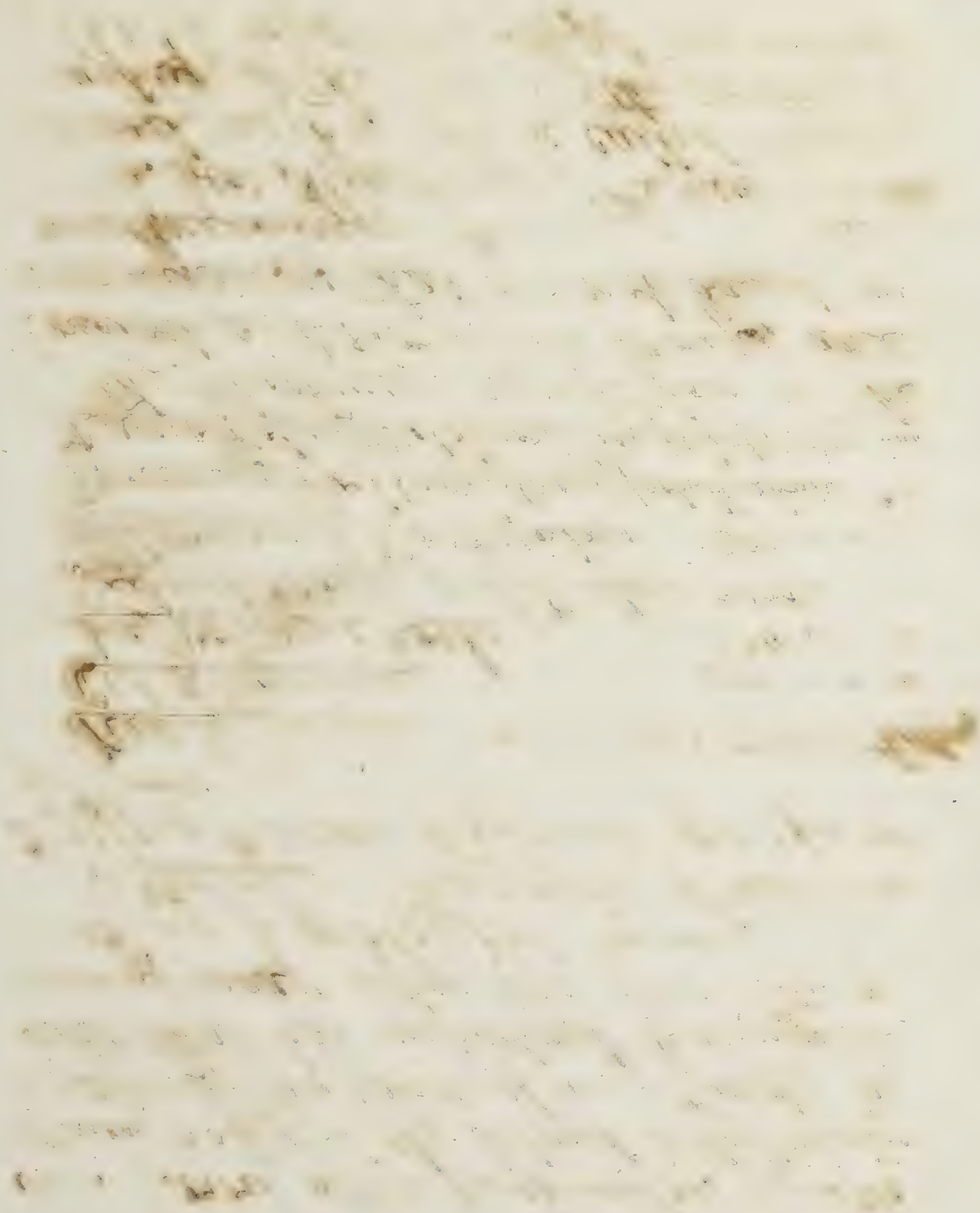


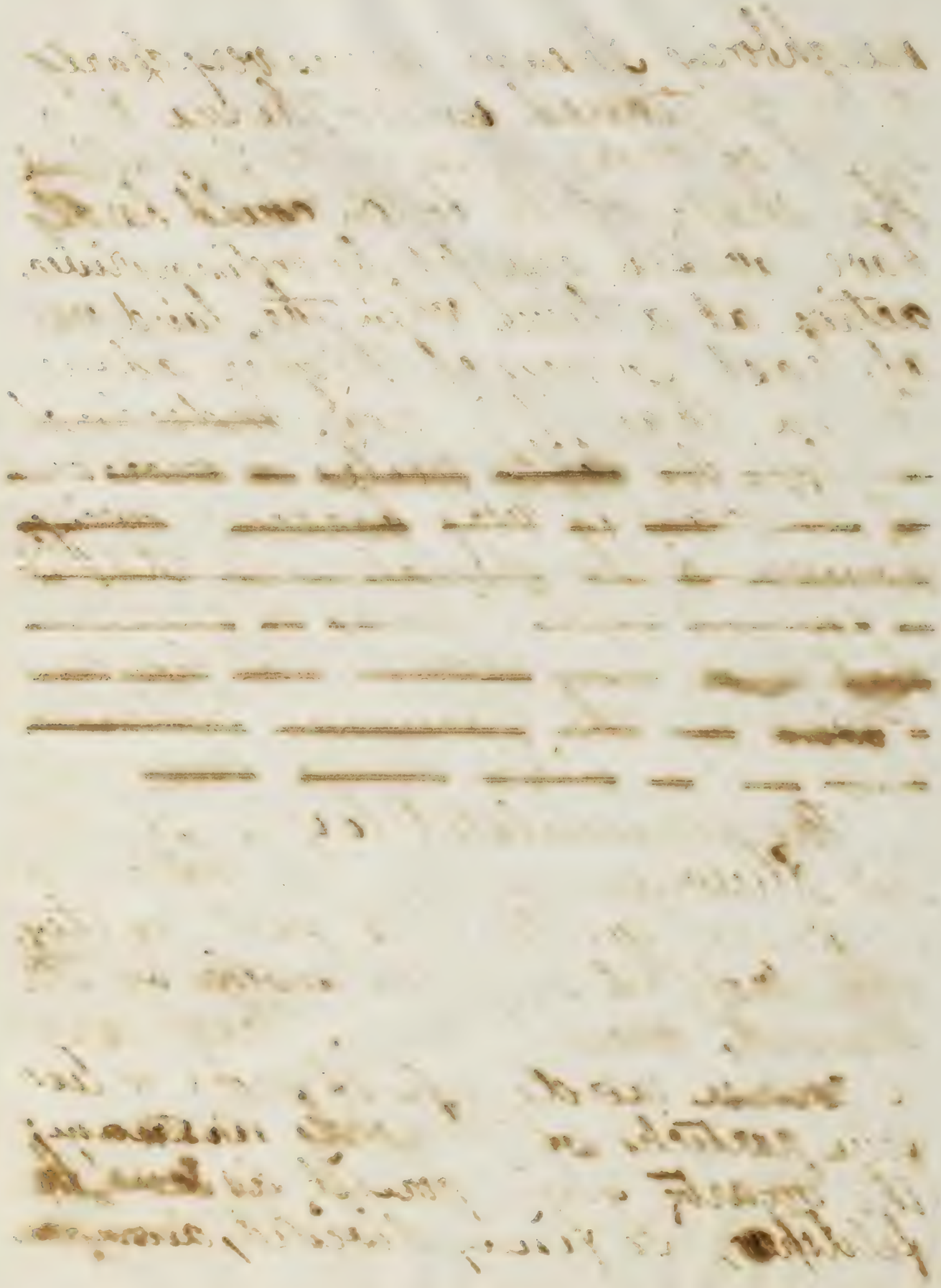


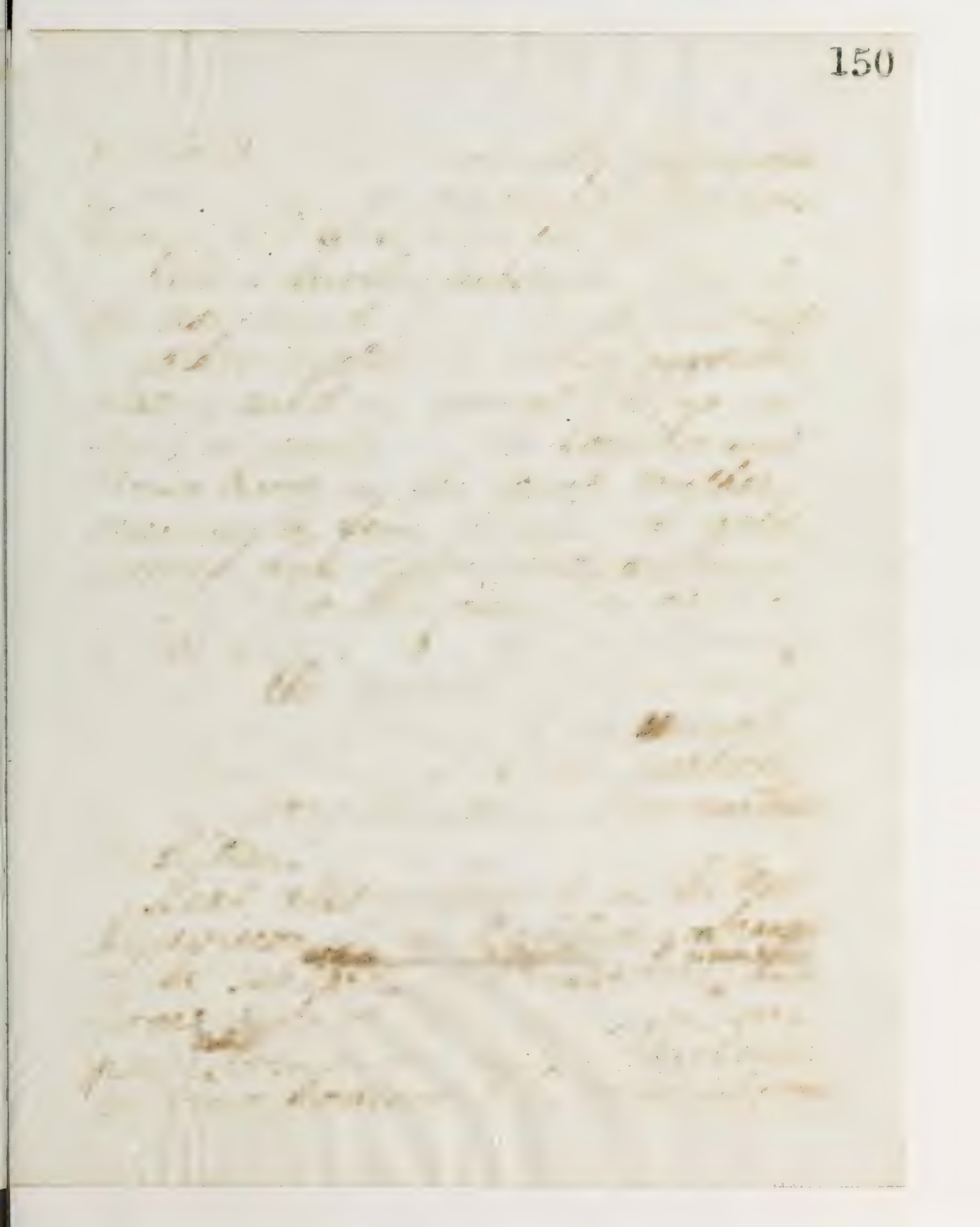












Matamoros, Sunday, [illegible]

My dear Mr. [illegible]:

[illegible] I have attached [illegible]

[illegible] finished

yesterday [illegible] had been expected

[illegible]

[illegible]

[illegible]

one or two days here, instead of [illegible]

been [illegible]. Although it was not [illegible]

[illegible]

[illegible] and [illegible]

[illegible]

returned to the [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

yesterday

Matsmoto, Shinshiu Japan 4 July 1865.

Matsumoto, Shinshiu, Japan: 15 July, 88

To the Chief Signal Officer of the Army,
Washington, D.C.

Sir:

I have to acknowledge with many thanks the receipt [illegible] [illegible] copy of the [illegible] bringing an interesting copy of the International Bulletin. The [illegible] [illegible] [illegible] I have [illegible] the kindly offer of sending by mail from [illegible] [illegible] [illegible], [illegible] [illegible] and I have sent word to have them [illegible] [illegible] [illegible] [illegible] for which they were [illegible]. Since writing you last I have received from [illegible] my letter that was very lengthy [illegible] [illegible] [illegible] [illegible] printed [illegible] [illegible] [illegible]. I have [illegible] [illegible] [illegible] in regard to observations according to the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] to wait patiently [illegible] little [illegible] [illegible] [illegible] native observers [illegible].

My friend [illegible] of the Mining Office of the [illegible] [illegible] gave me [illegible] [illegible] of the meteorological observations of the office for [illegible] [illegible], and I forwarded [illegible] by mail. He also [illegible] [illegible] have his monthly printed sheets [illegible] [illegible] [illegible] in [illegible].

I am, Sir, Very truly yours,
[illegible] [illegible] [illegible] [illegible] [illegible]

[illegible], [illegible]; [illegible]

My dear Mr. [illegible]:

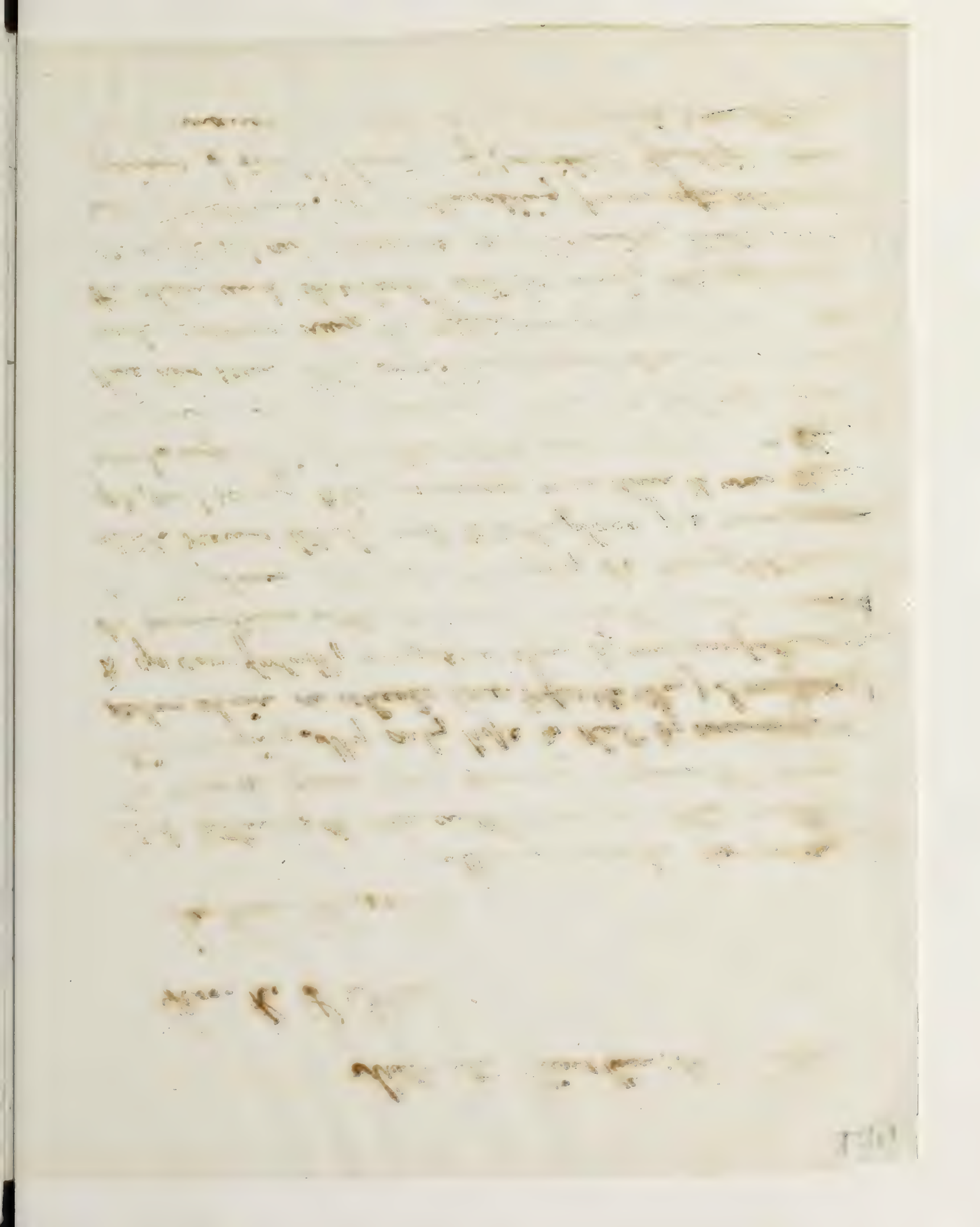
[illegible] day has this morning [illegible] enclosures, for all [illegible] I am very [illegible] [illegible]

[illegible] new fangled [illegible]

[illegible] day, the 18th, and [illegible]

[illegible]

DATE



[illegible]

Matamoros; 20 July, 1870.

My dear Mr. [illegible]:

Your two welcome [illegible] of the 8th and 19th came to hand last evening. The [illegible] and the [illegible] have been keeping me here from hour to hour and day to day until they finally [illegible] carriage last evening [illegible] [illegible] in the [illegible] [illegible] [illegible] satisfactorily, there is so much [illegible] in the [illegible] cannot be [illegible] [illegible] [illegible]

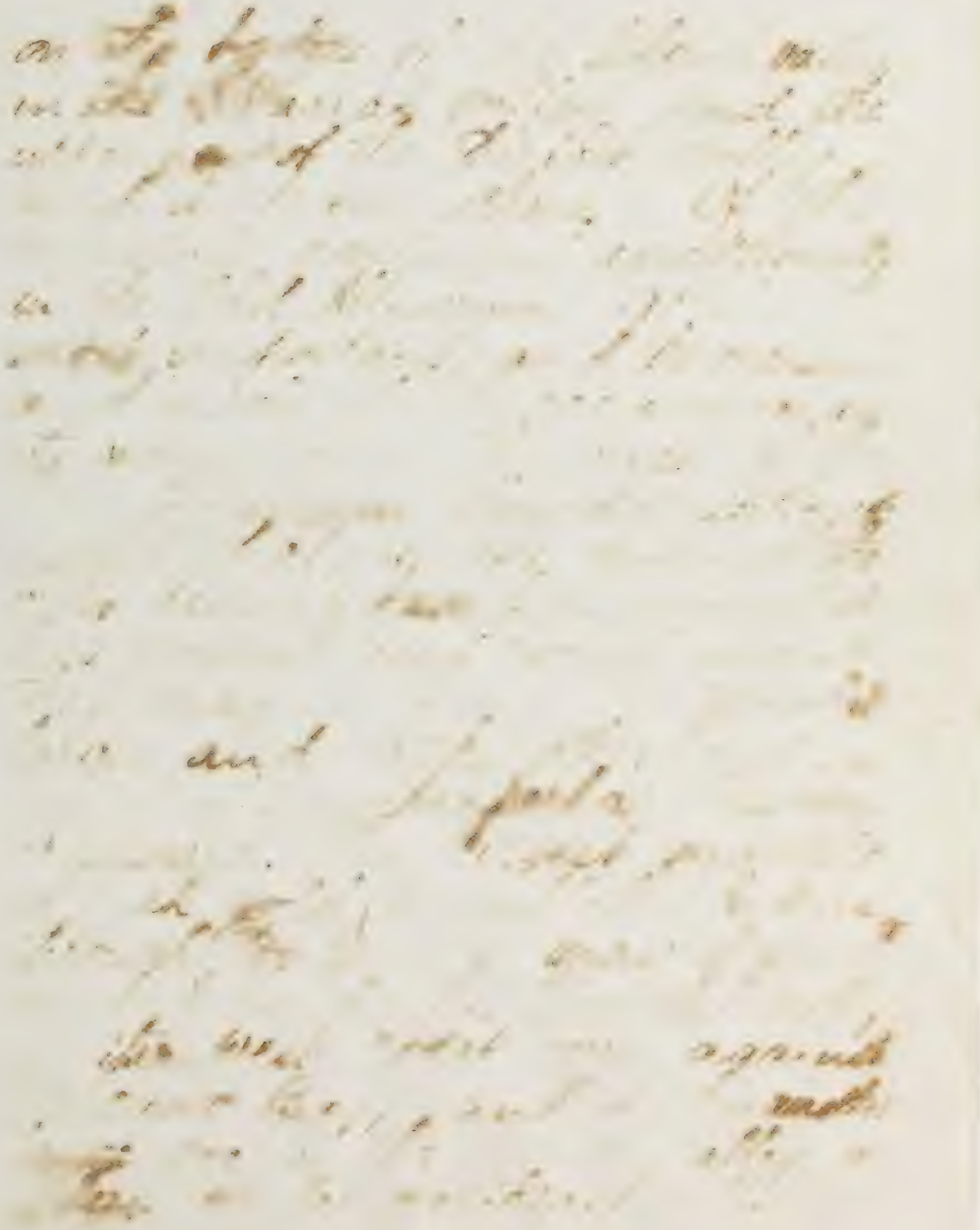
[illegible] was [illegible] for the purpose of making the motion [illegible] in a common [illegible] [illegible] [illegible] difficulty without [illegible] the [illegible] for it might [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] I think of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] at least it may be possible to make the journey from here to [illegible] in two [illegible] and [illegible] and if possible [illegible] [illegible] [illegible] [illegible] [illegible] all places [illegible] [illegible] off until a more convenient time. [illegible] please [illegible] you [illegible] and [illegible] [illegible] there [illegible] [illegible] [illegible] there may possibly be [illegible] from my infirmity or other

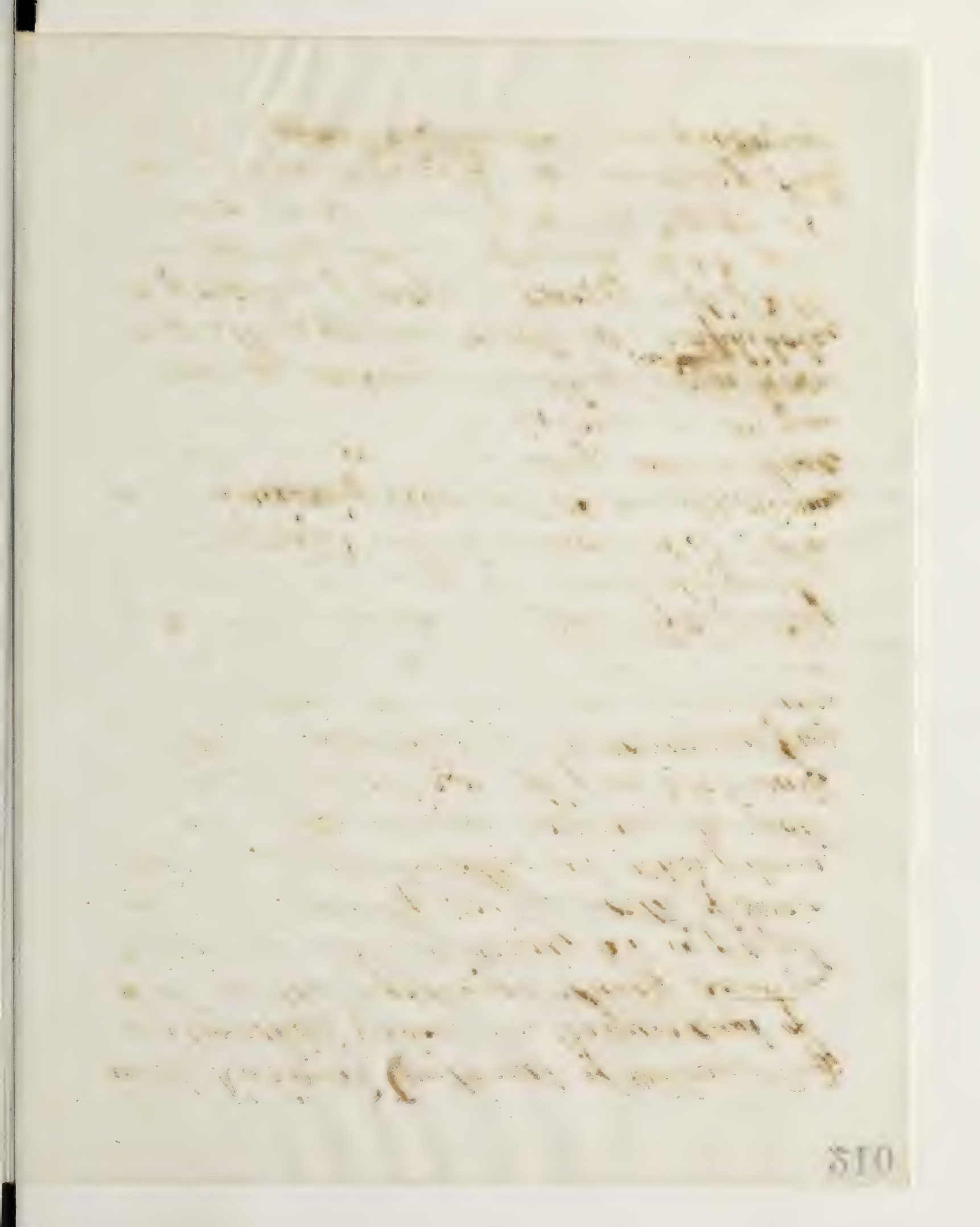
I think now that I understand the management of my case very well. There is nothing whatever to be done but to keep as perfectly quiet as possible and it may need several weeks for a cure. It seems that even a little walk about the house has a bad effect setting up the inflammation and great pain. My last [illegible] I [illegible] you my [illegible] apparently [illegible] [illegible] days, within the two days past and for my [illegible] yet [illegible] the pain [illegible] a little walking [illegible] so slight that it is very hard to keep quiet; yet that little movement at short intervals [illegible] to keep me in a bad condition [illegible] a walk of a mile or two [illegible] extremely bad effects. Although [illegible] recommended to take the [illegible] [illegible] I still [illegible] the [illegible] [illegible] we were already [illegible] [illegible] [illegible] I have [illegible] [illegible] [illegible] [illegible] I have no [illegible] [illegible] permanent [illegible] in this case can be got [illegible] [illegible] [illegible] [illegible] would be transported to the [illegible] [illegible] [illegible] of one of these [illegible], I would [illegible] [illegible] [illegible] [illegible] a month or two. The [illegible] [illegible] [illegible] and [illegible] [illegible] likely to suffer so much from being quiet as to delay [illegible] [illegible] [illegible] [illegible].

Please give my best regards to all your companions, and believe me always [illegible]

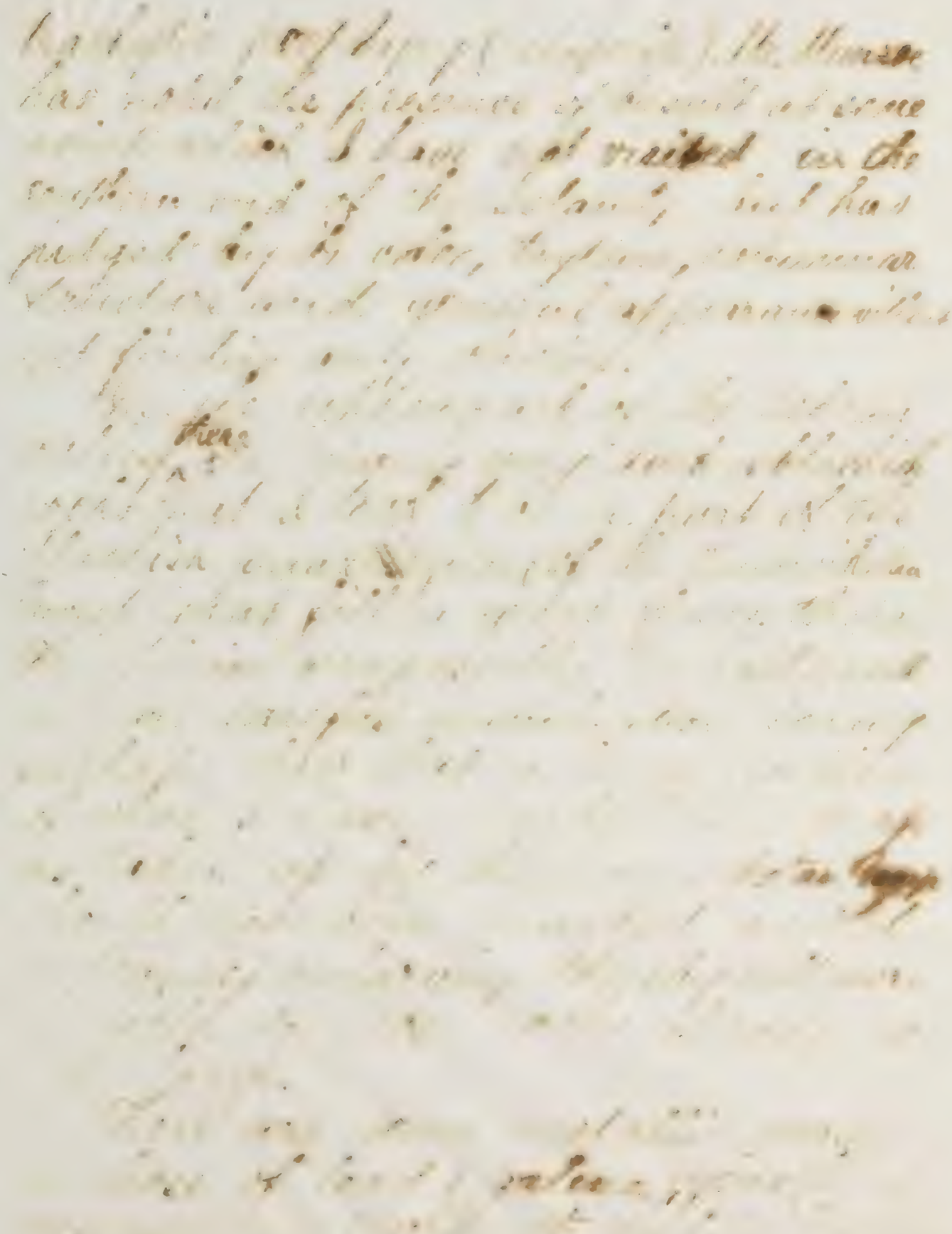
Benj. Smith Lyman.

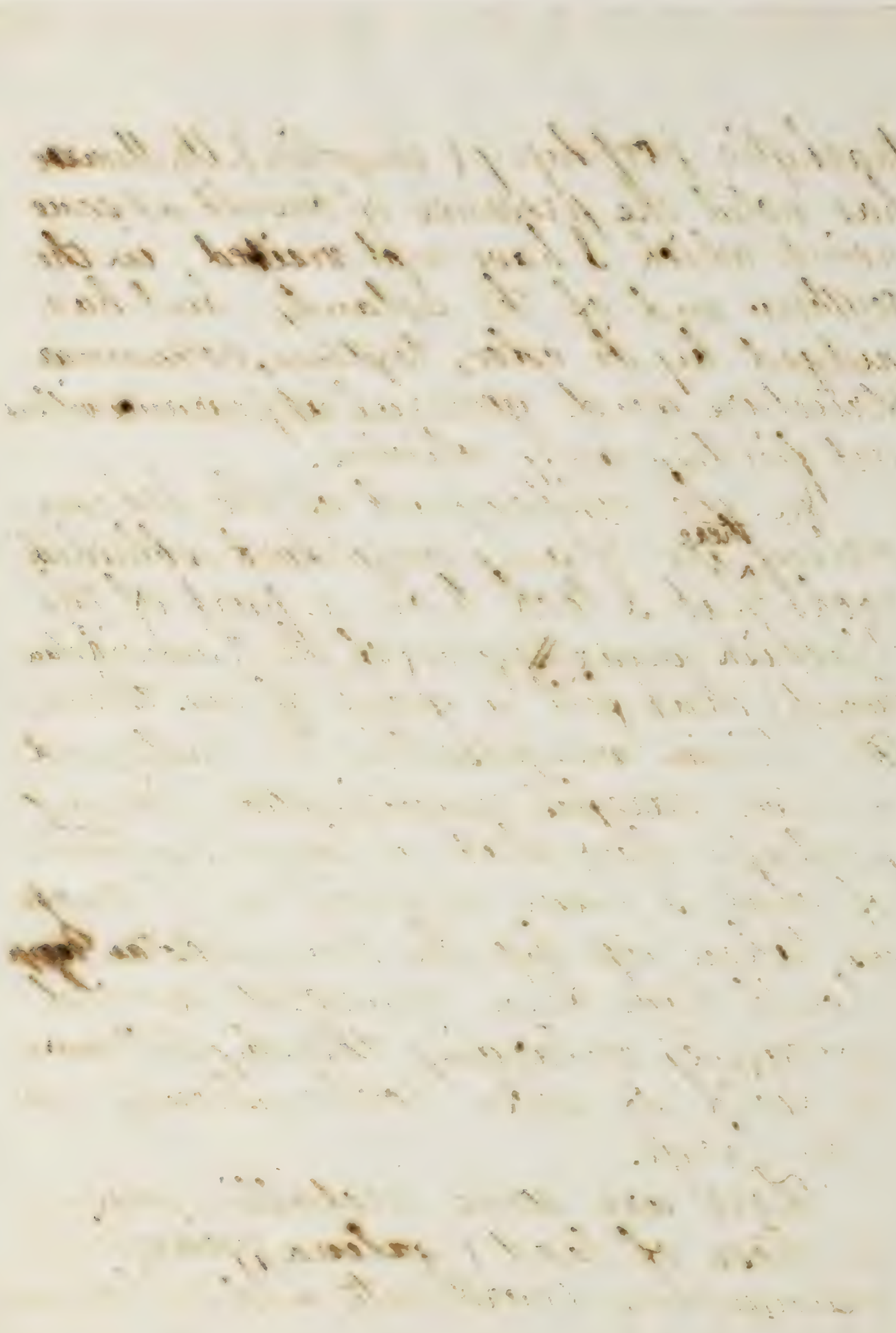
[illegible] [illegible] as possible. B[illegible]





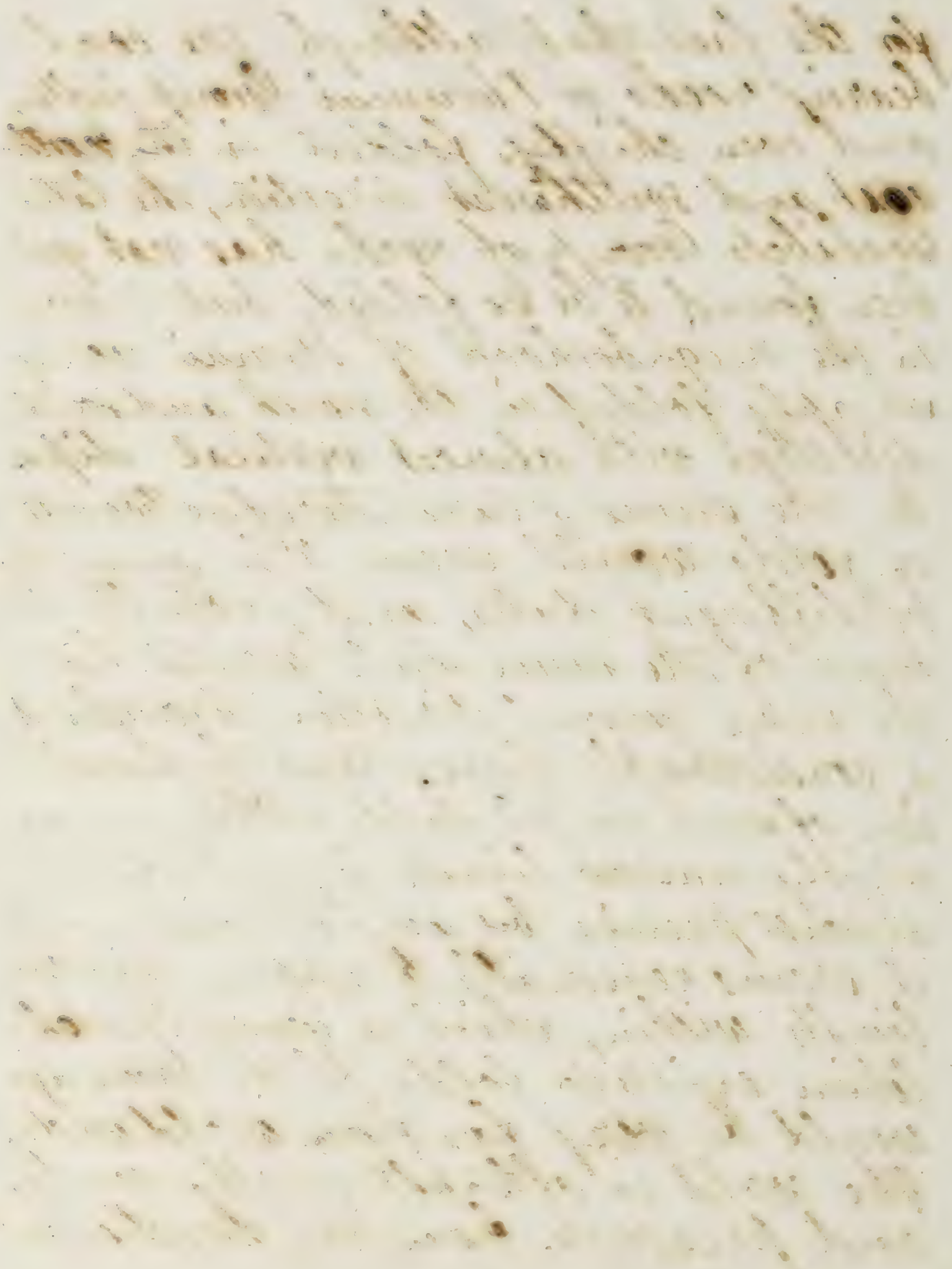
211

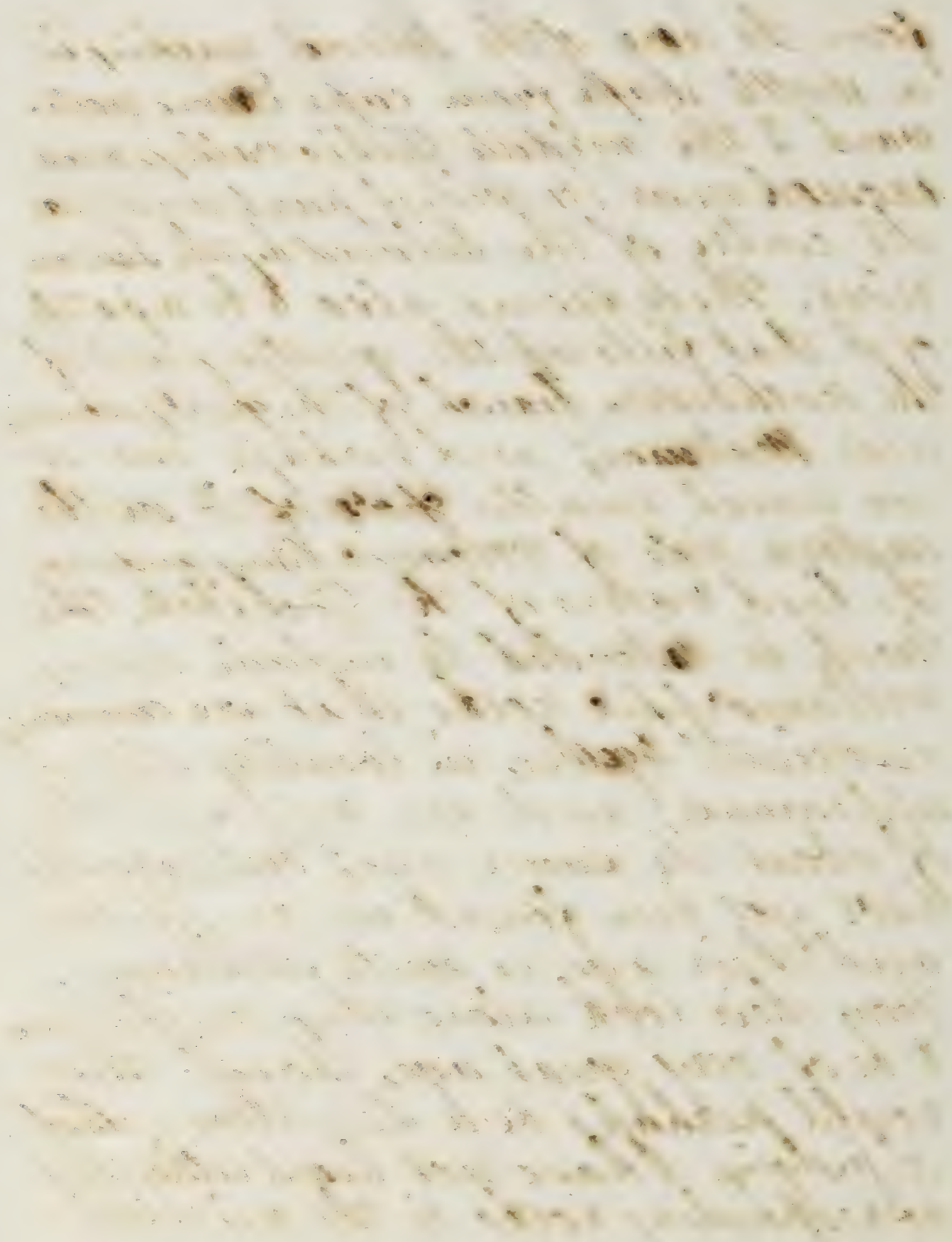


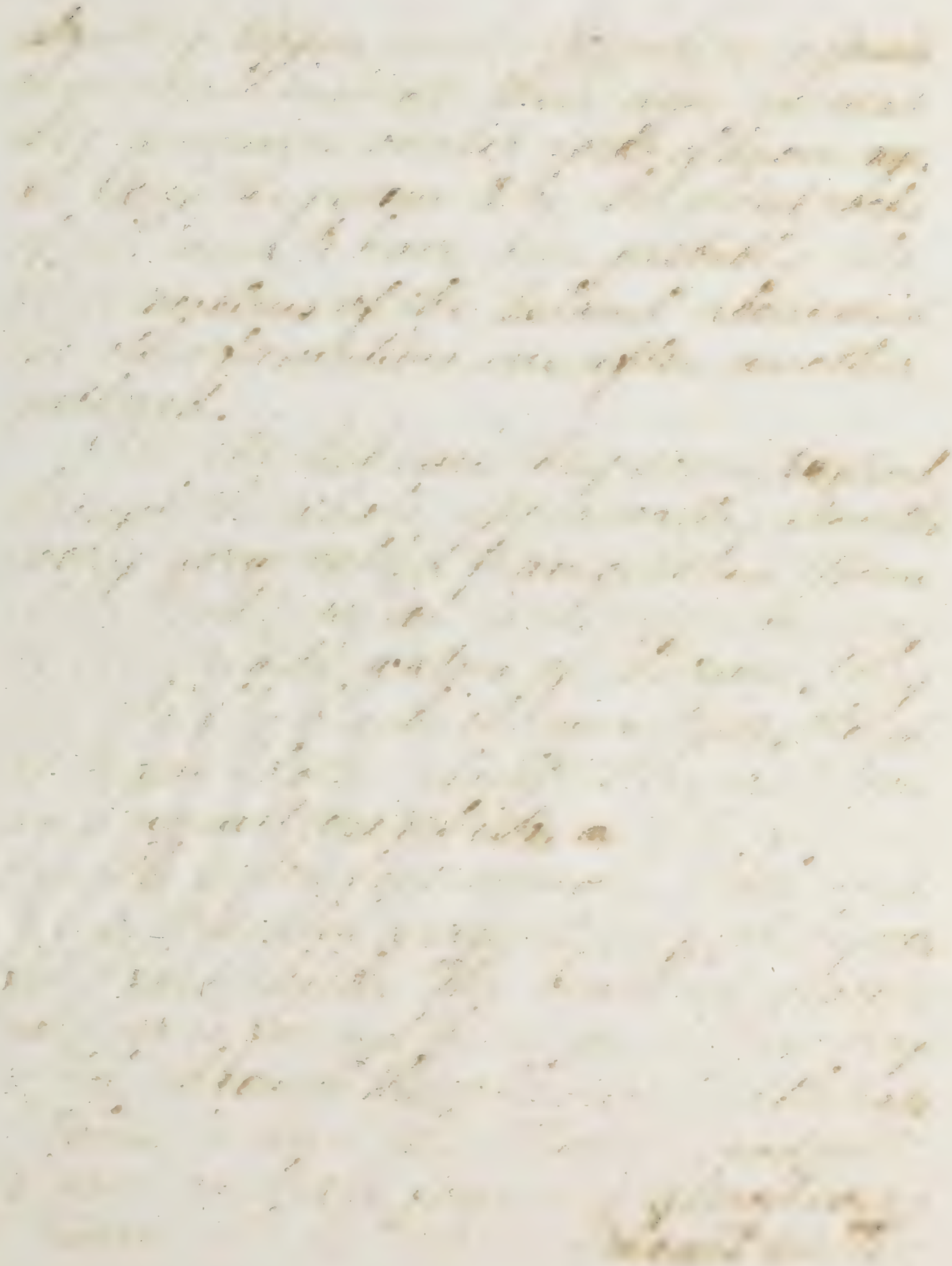


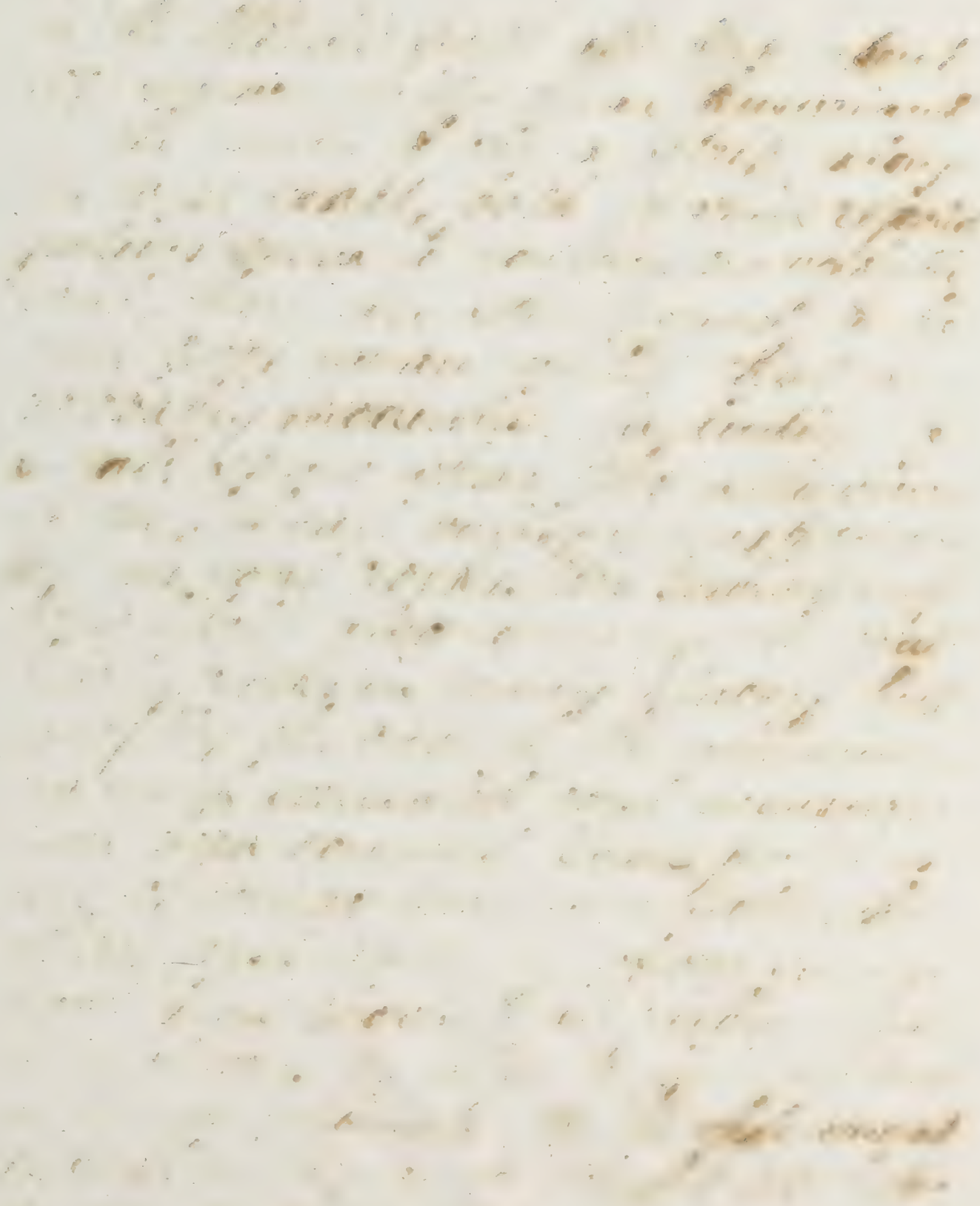
probable that the same group of [illegible] ... in so many different places should have had a like origin [illegible] ... originally in the [illegible] ... majority of cases [illegible] ...

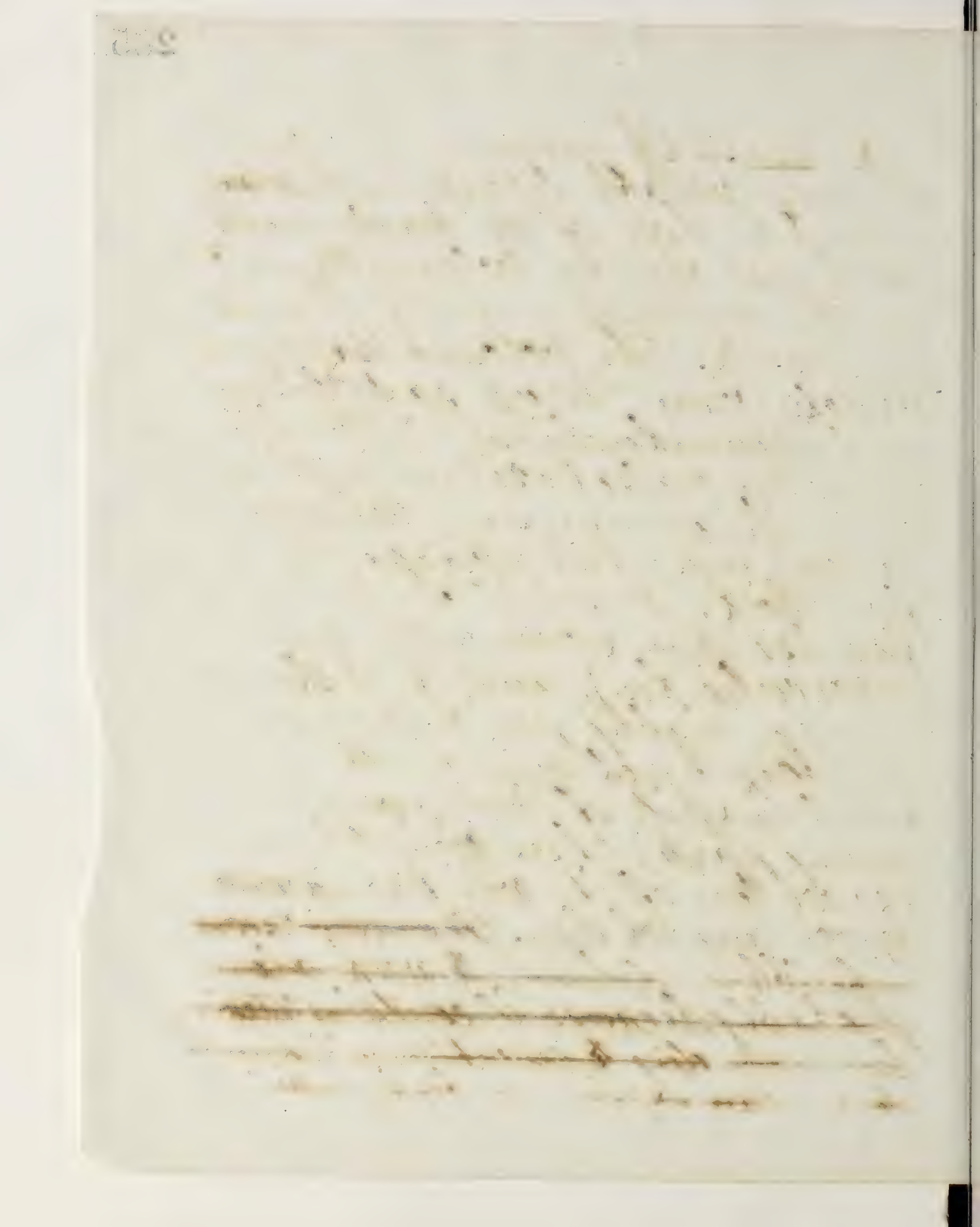
[illegible]

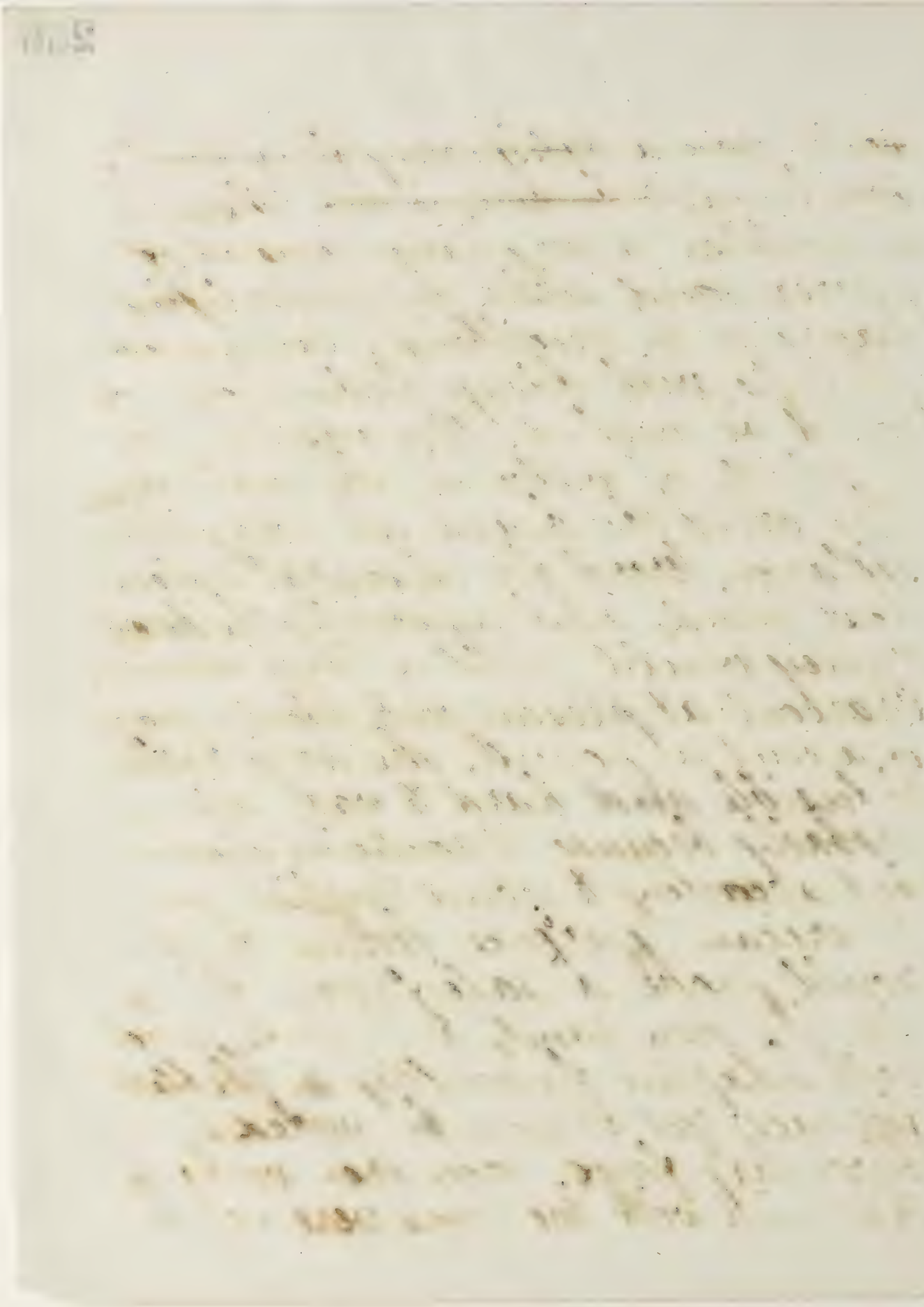


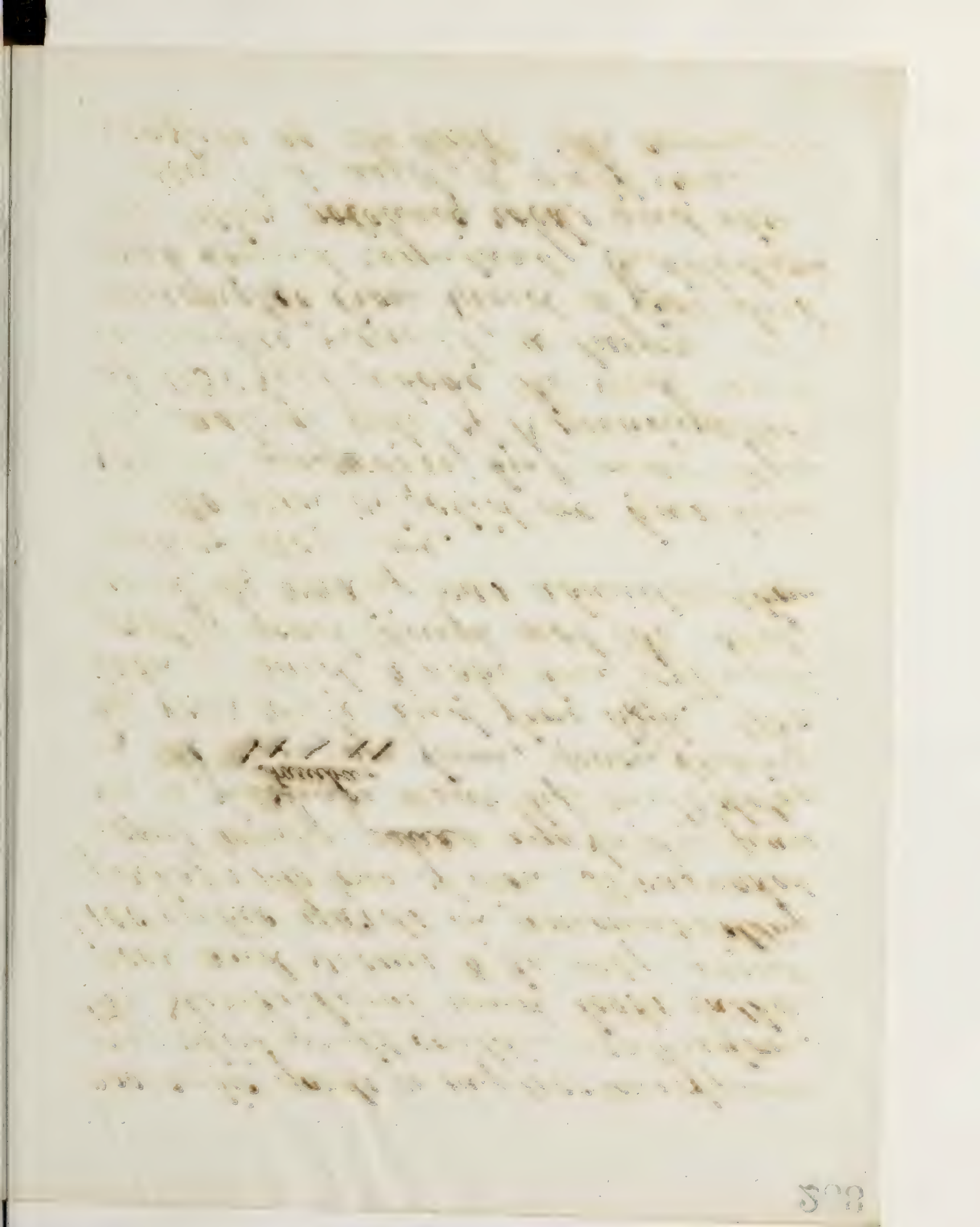


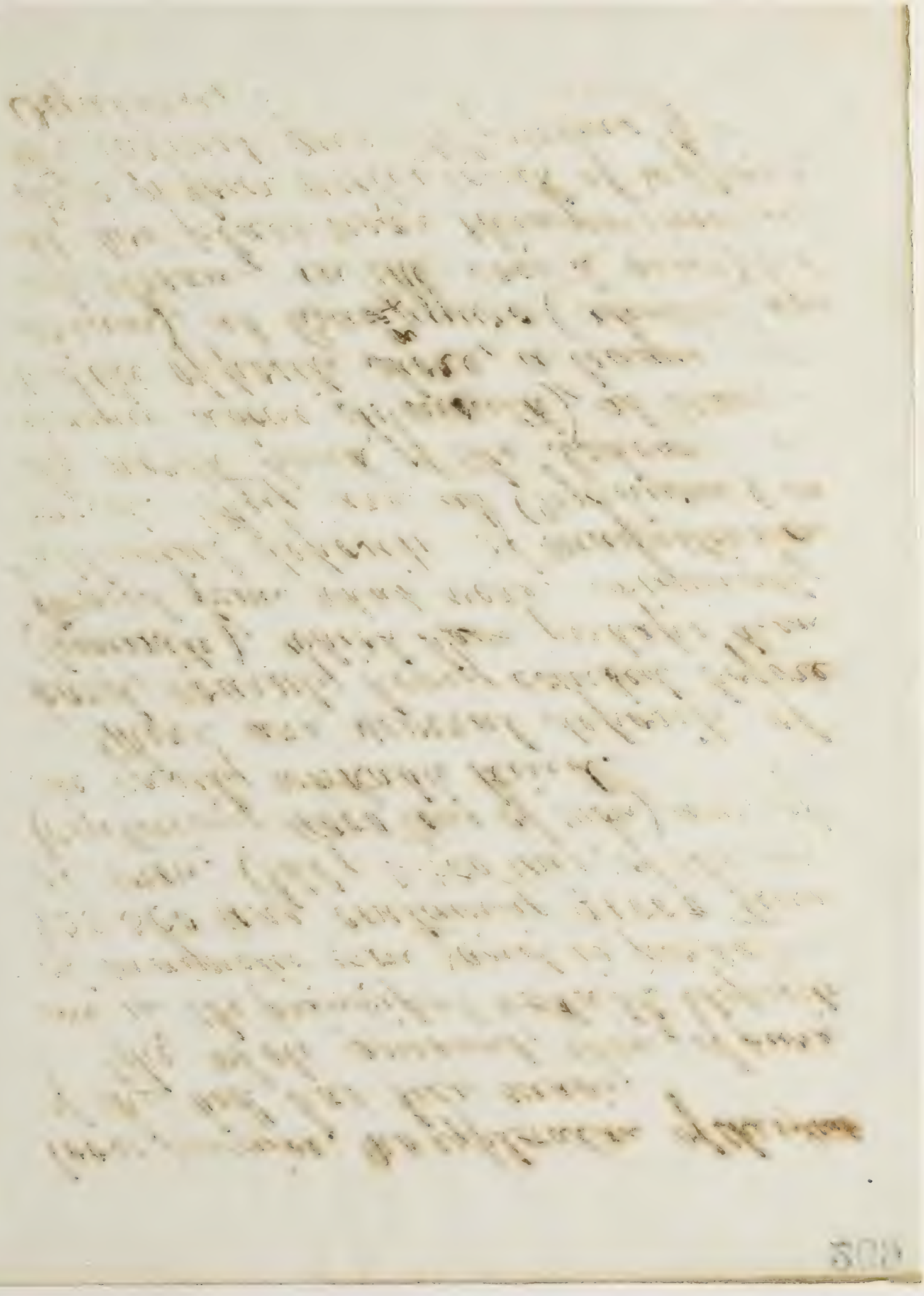






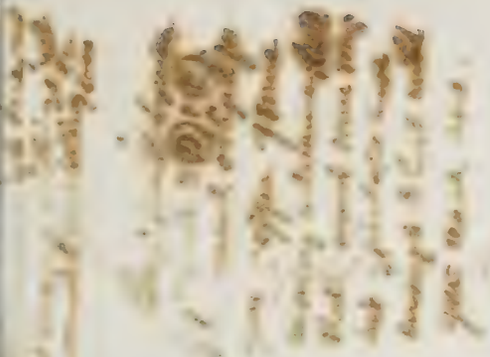






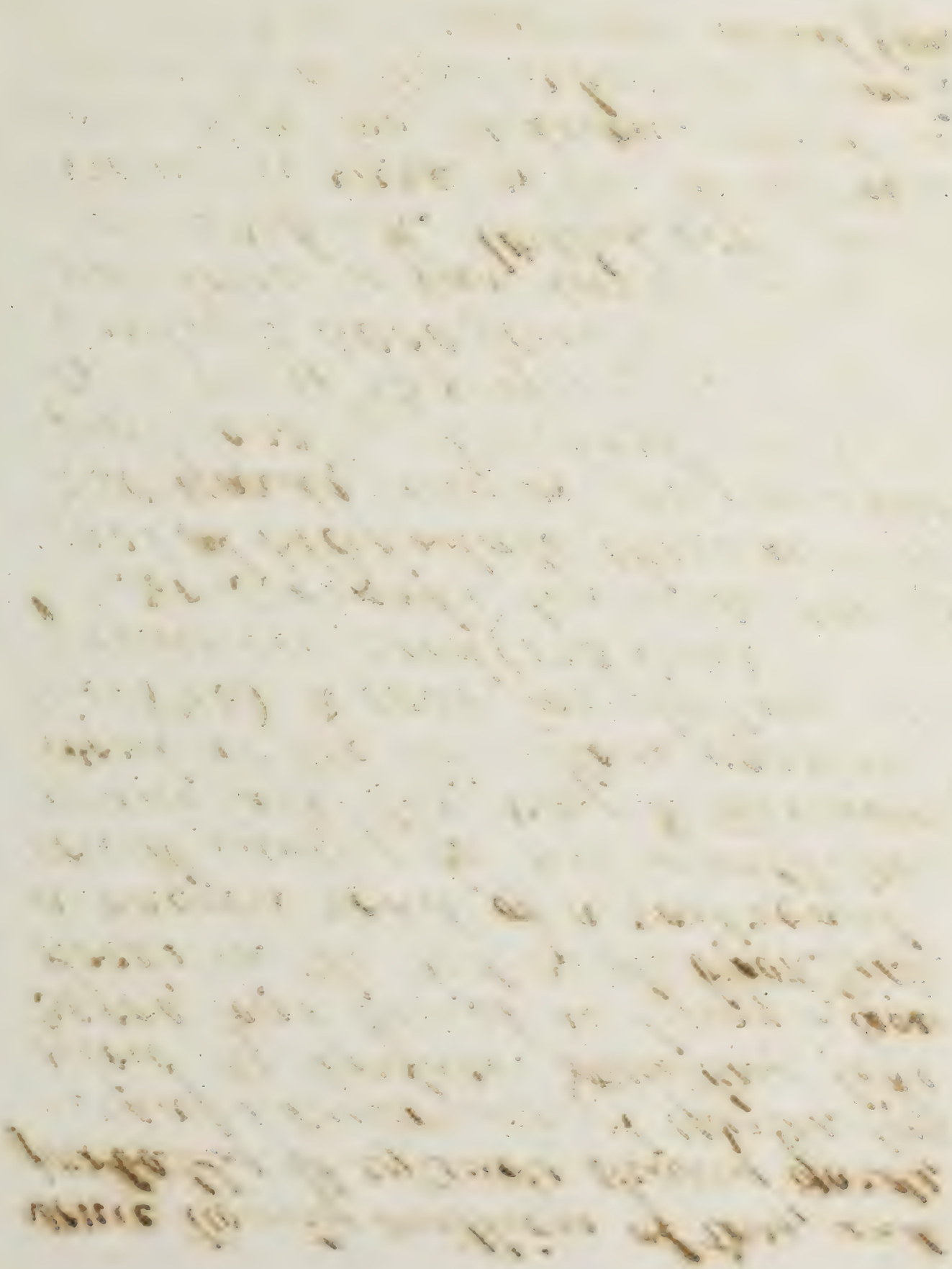
well aware of your own great excellences and of
your appreciation of their worth.

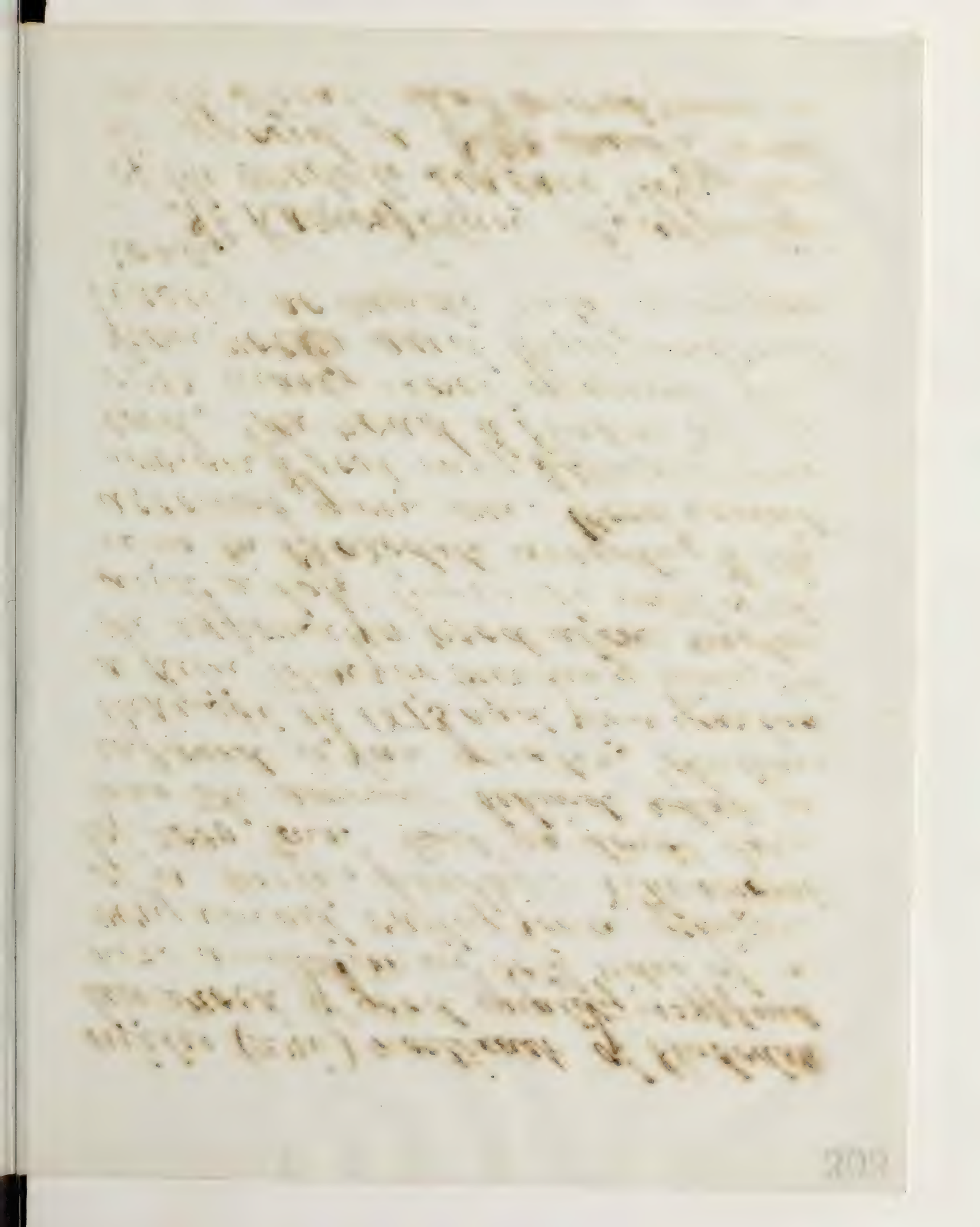
I have been much struck by the fact that the
prime ministers appointed who have been distin-
guished

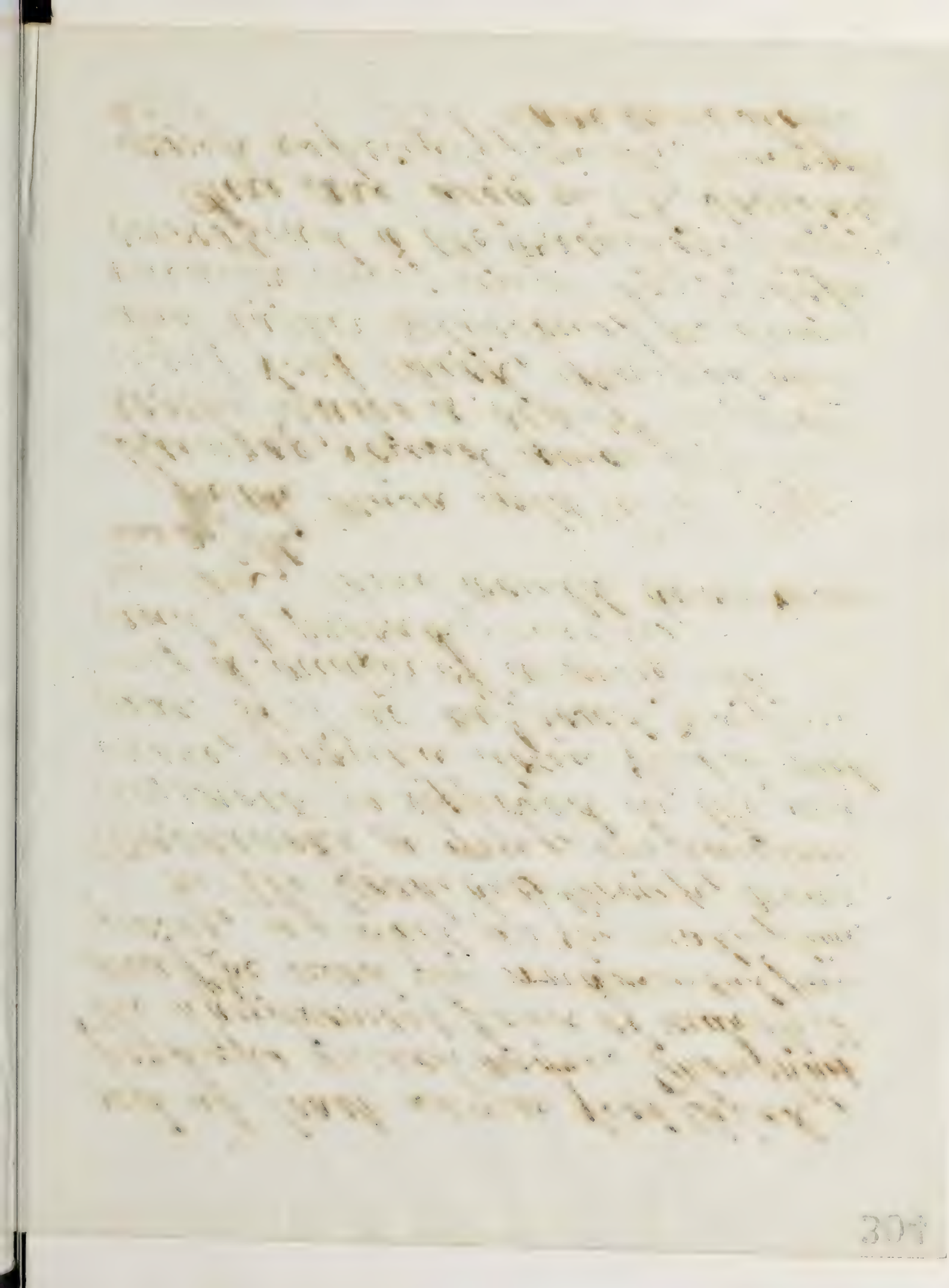


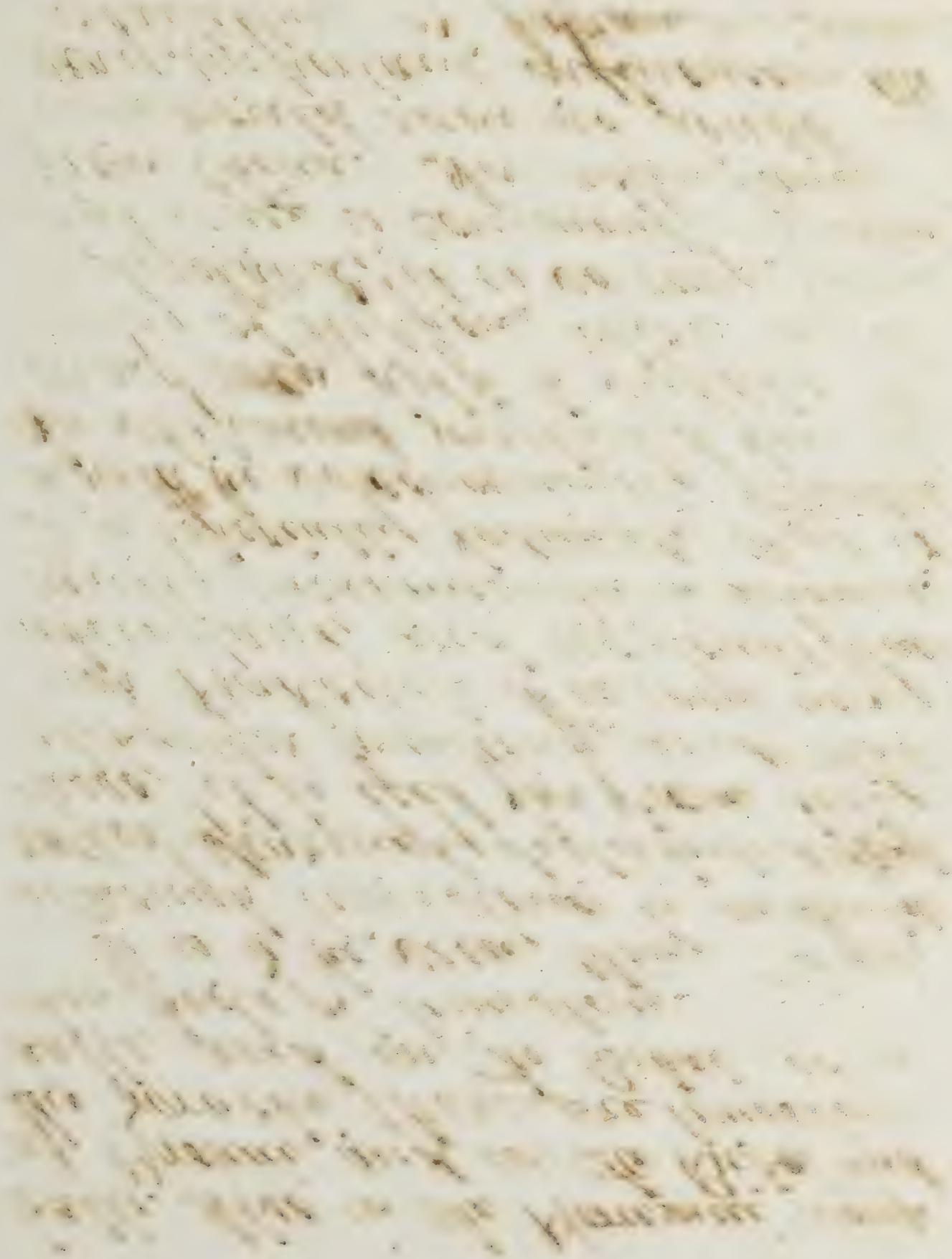
Watkins Creek, 10 Aug 1876.

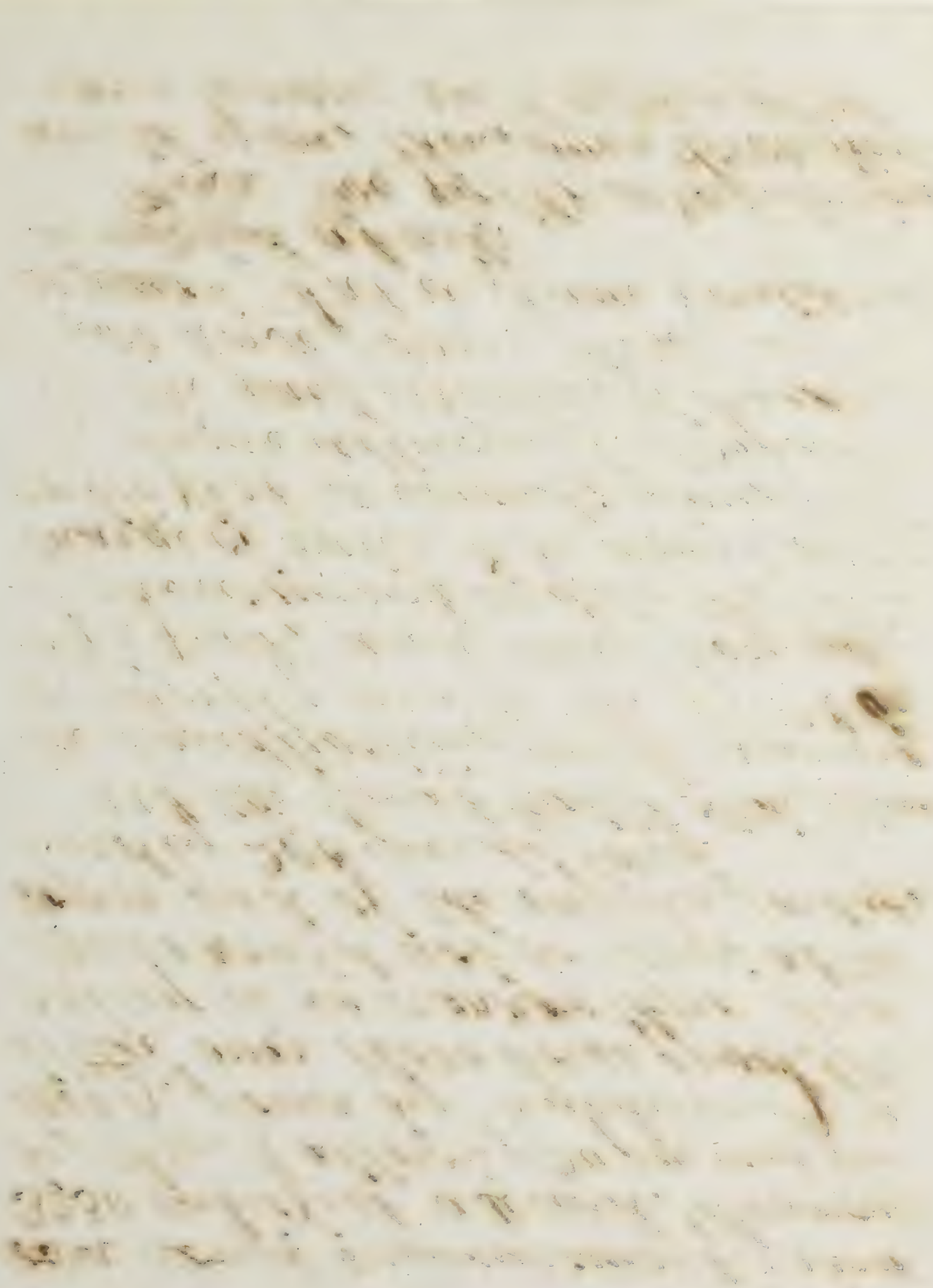
Baltimore, 16 Aug. 1876.

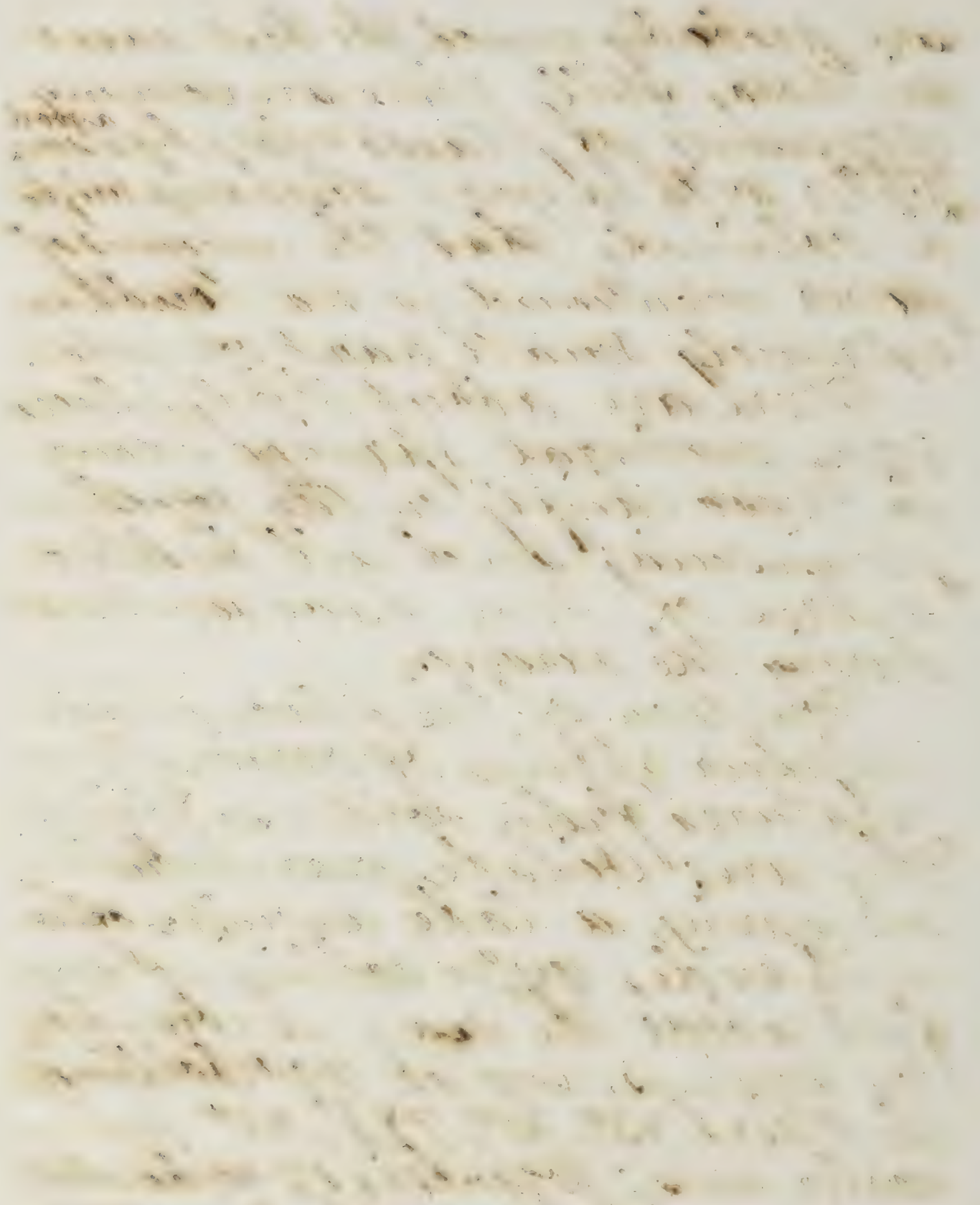


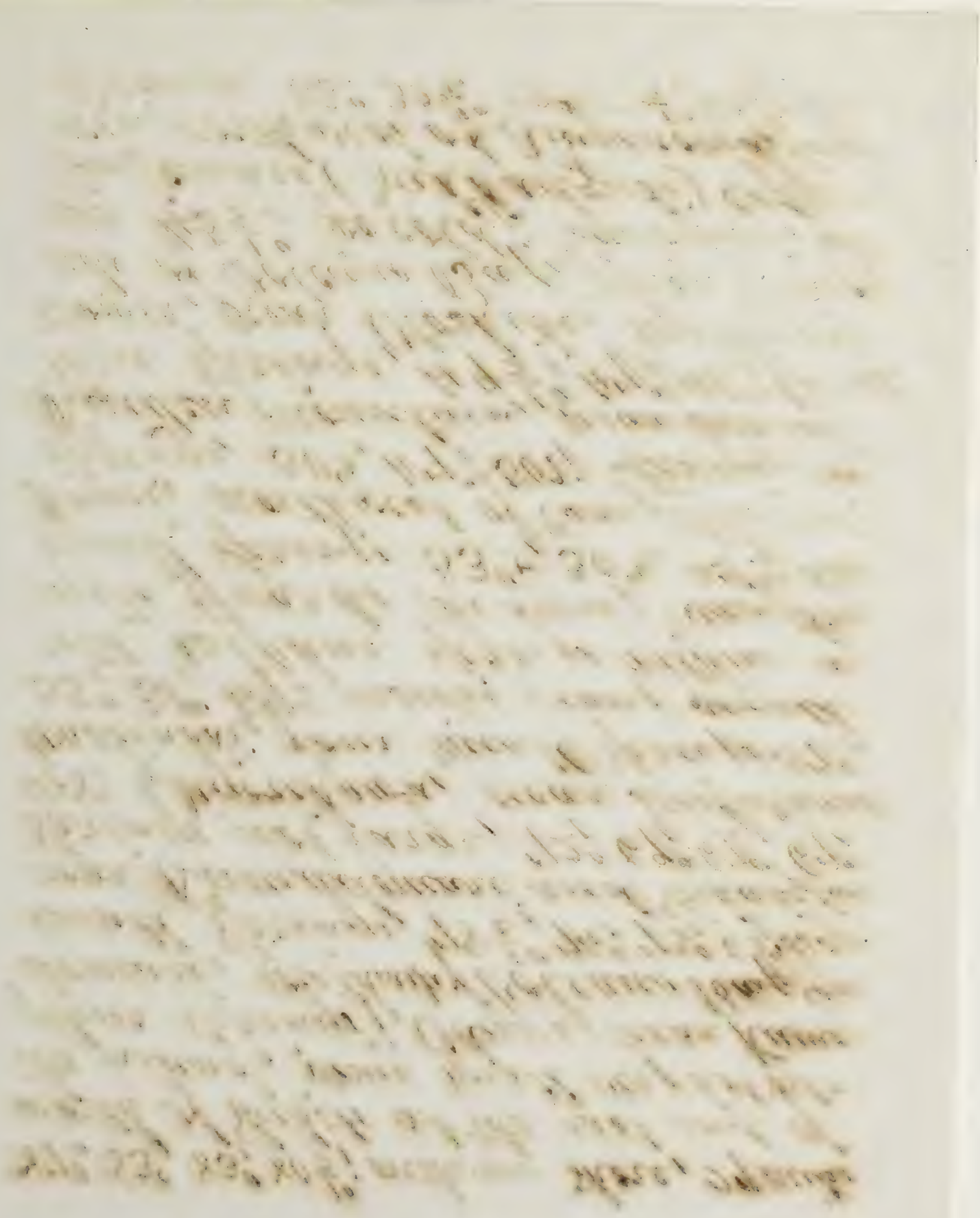


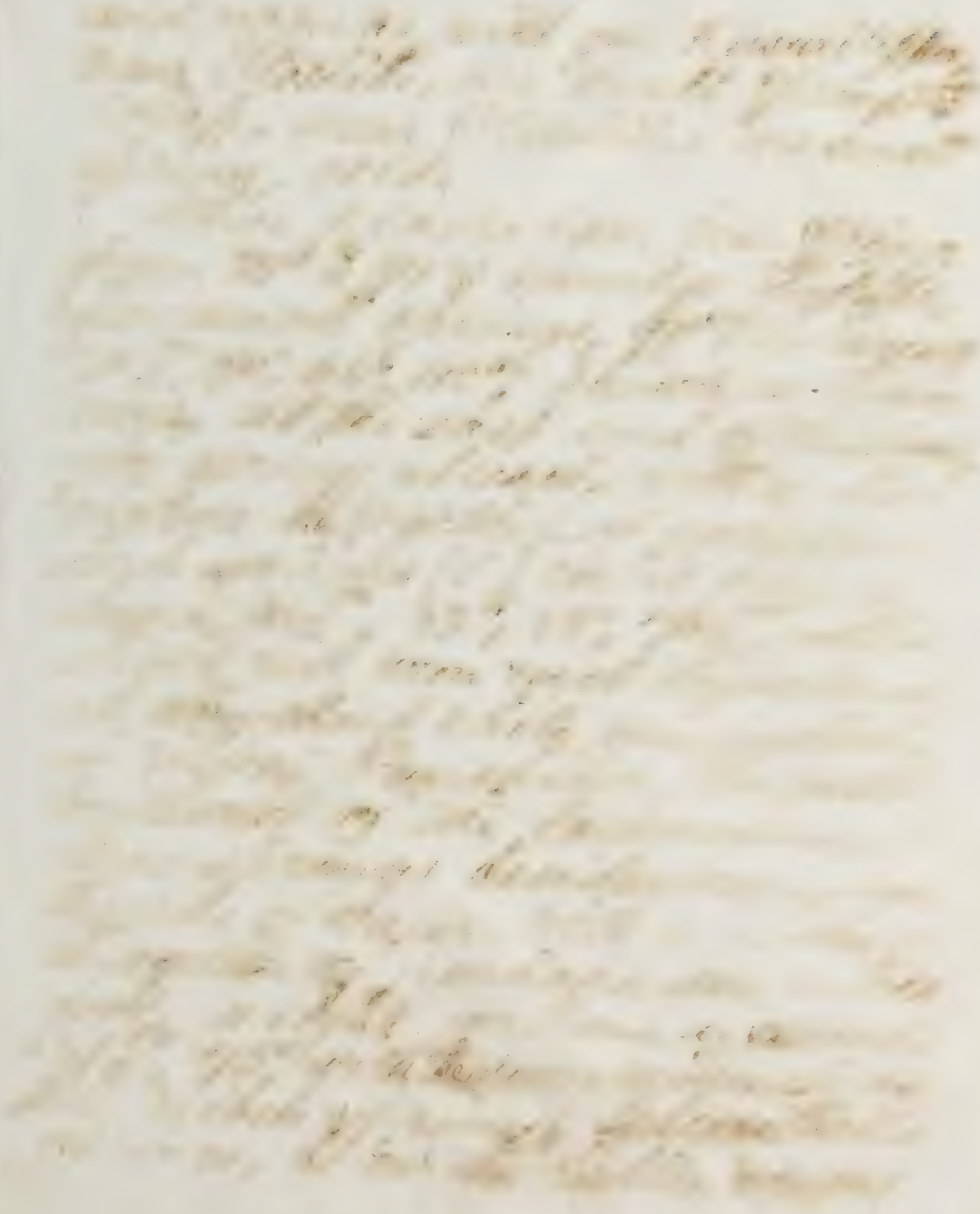


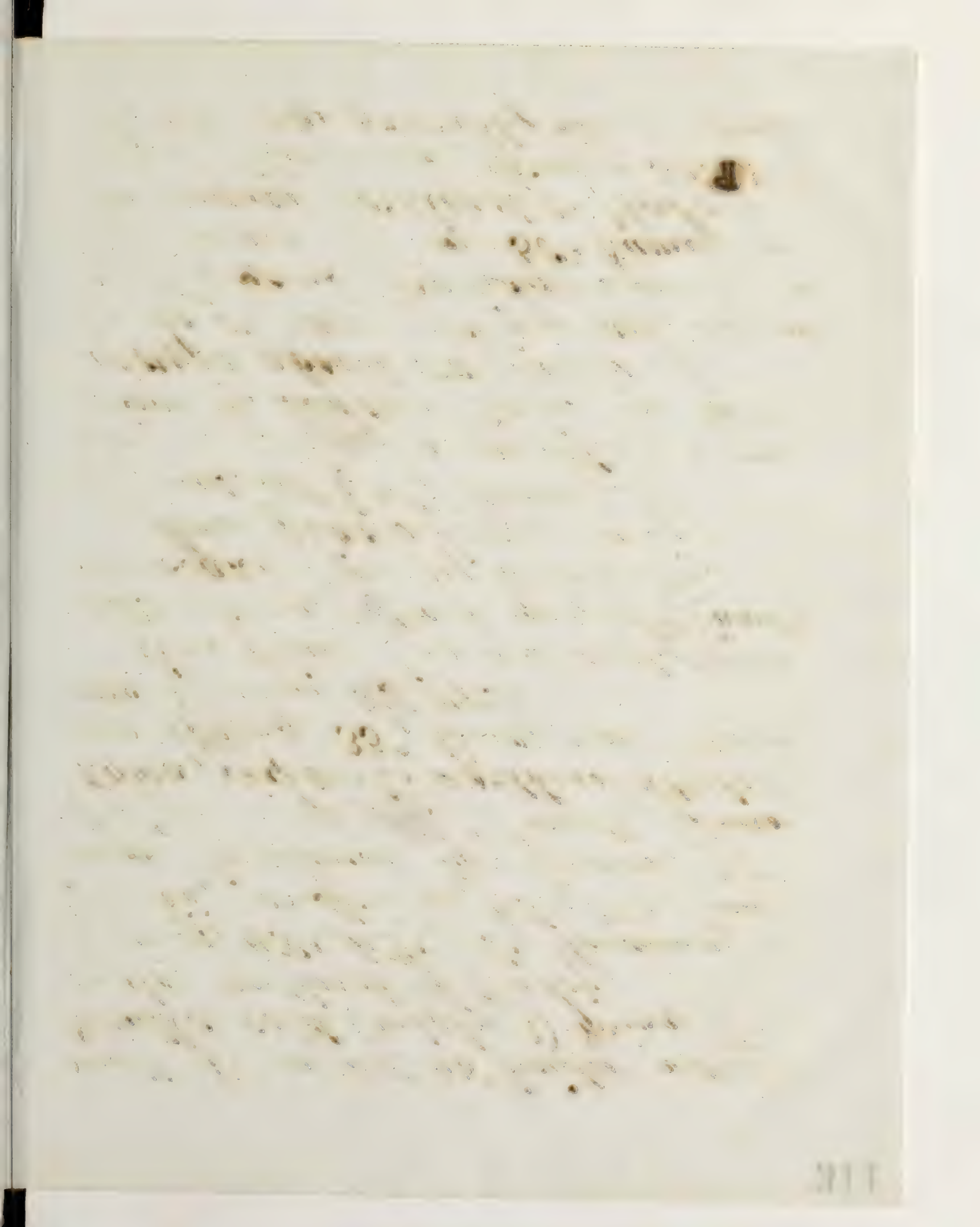


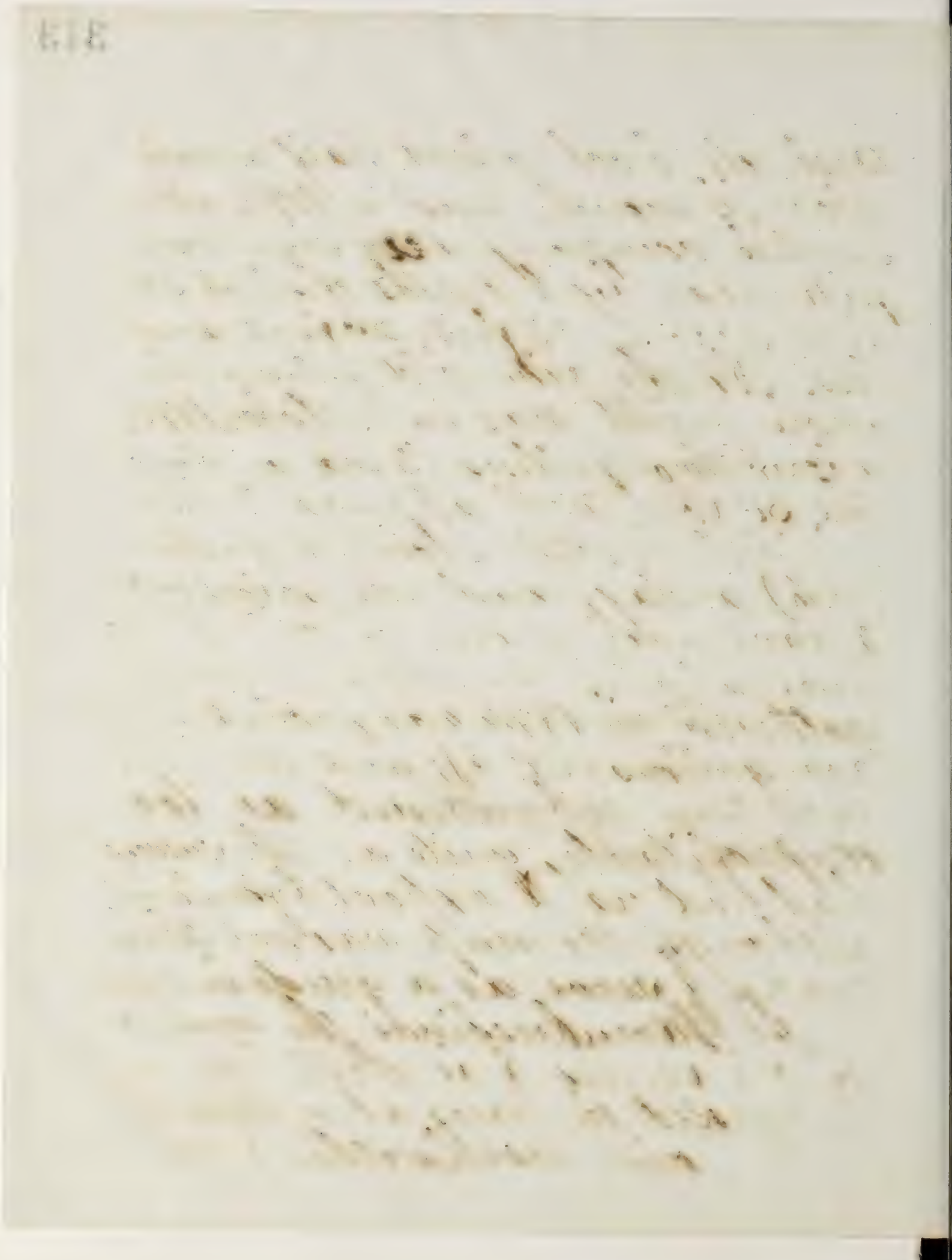












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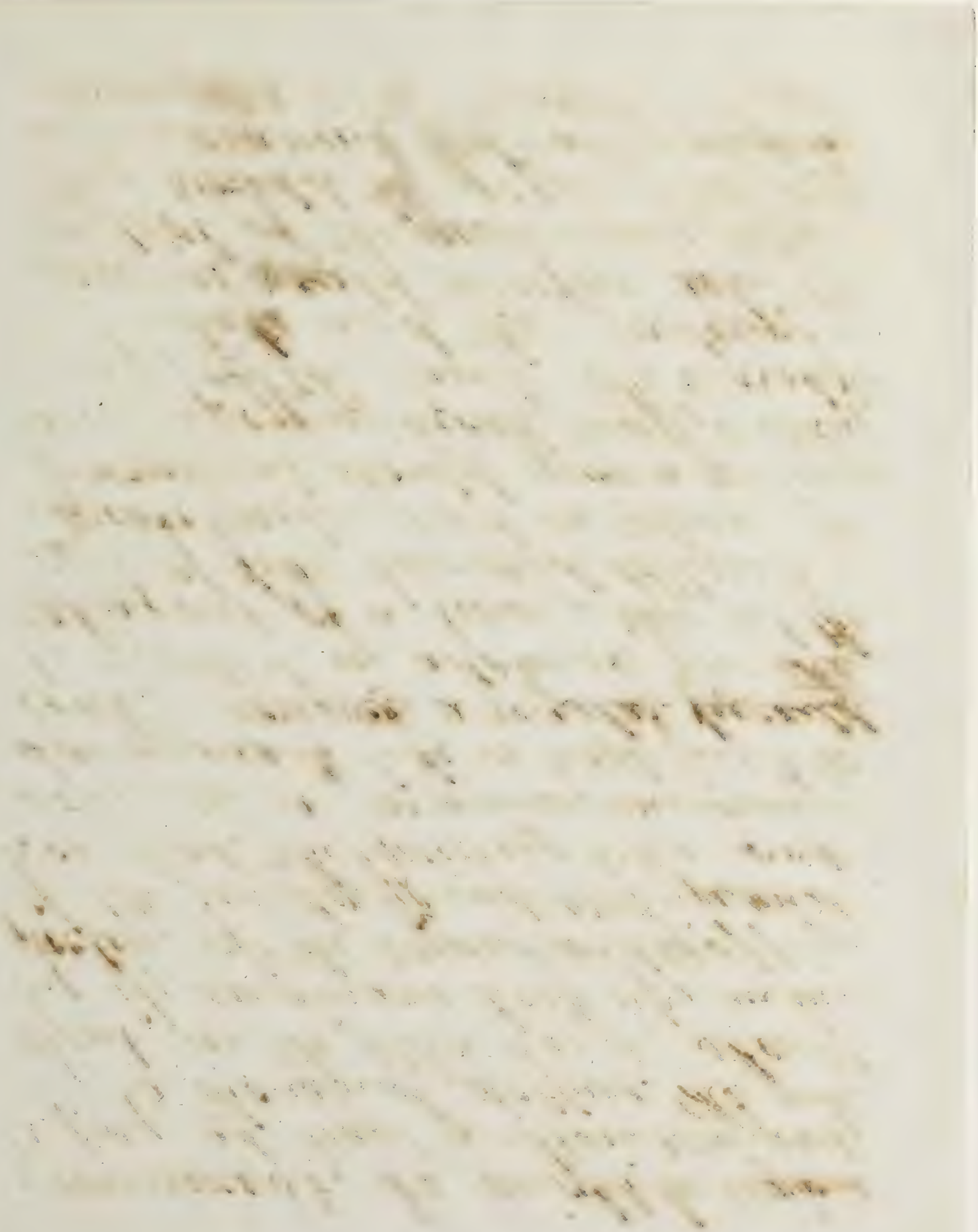
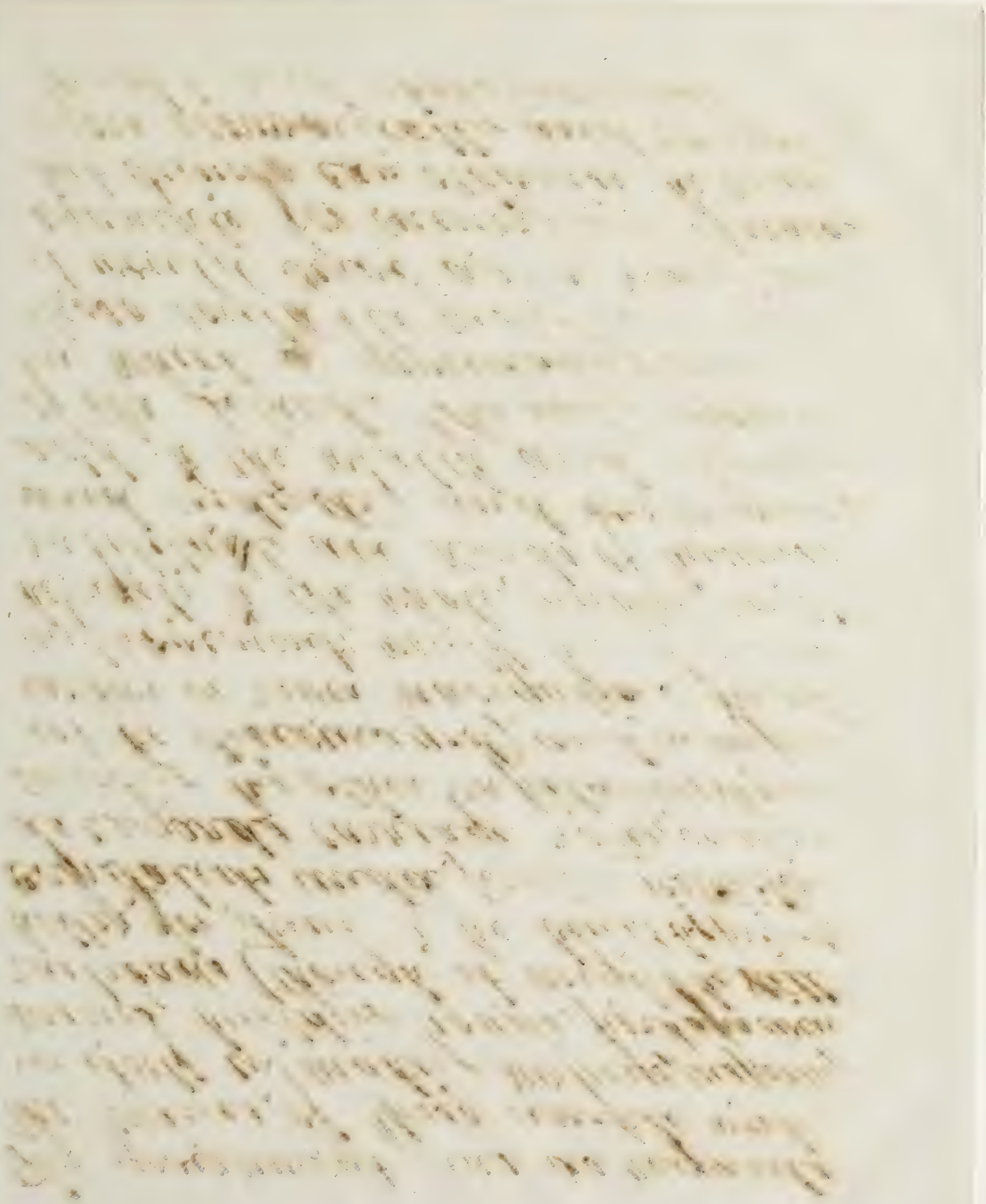
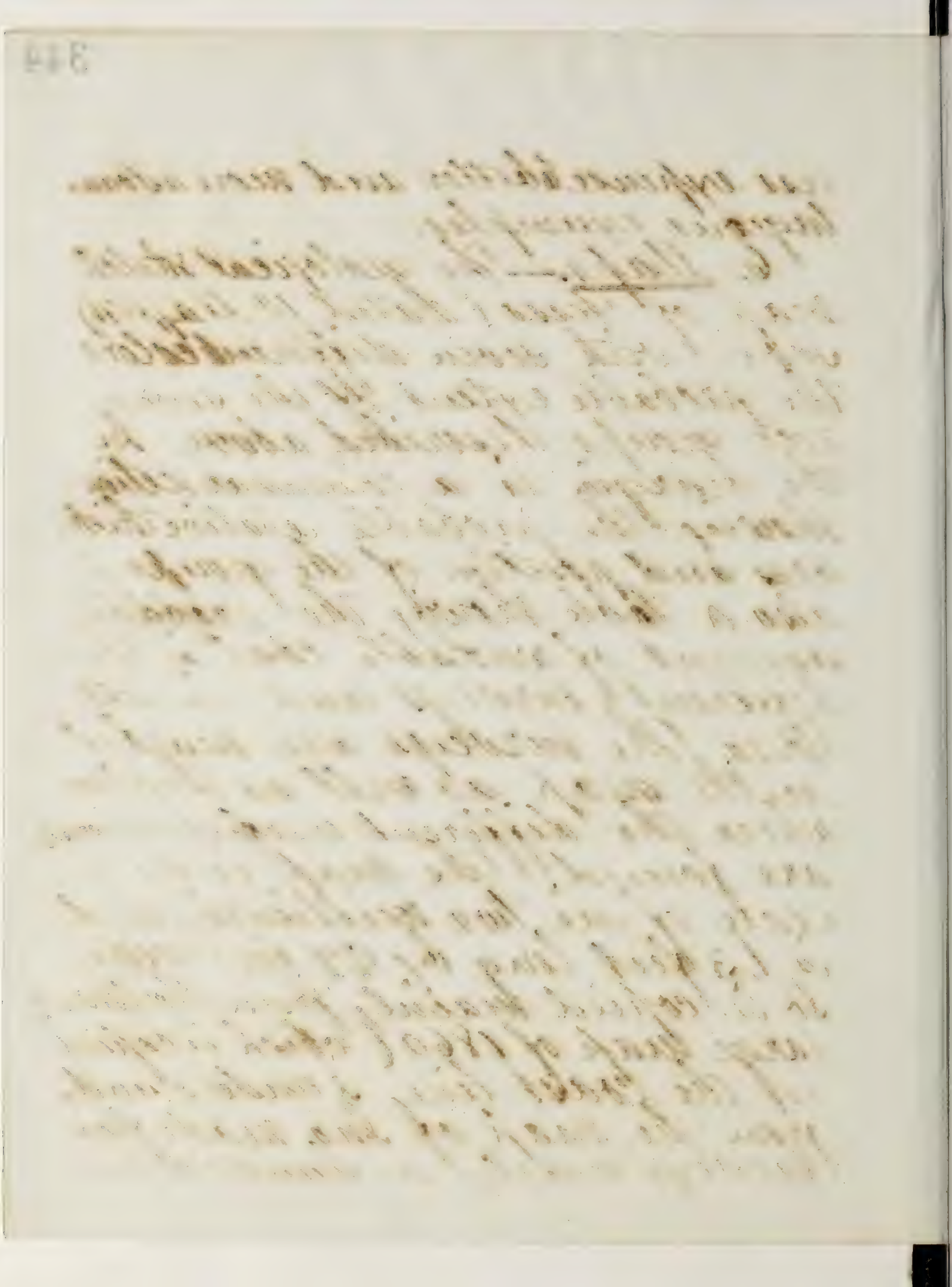
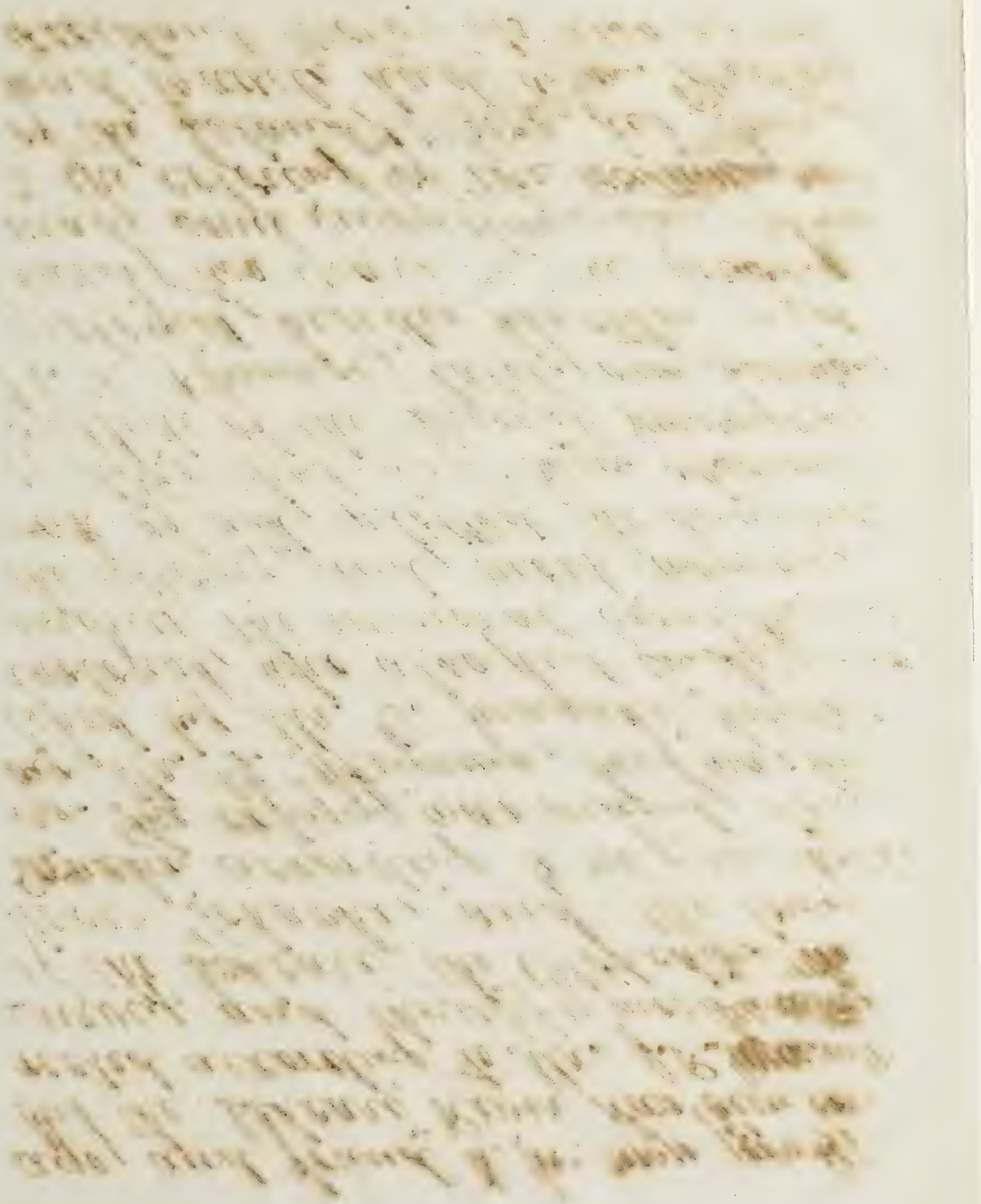
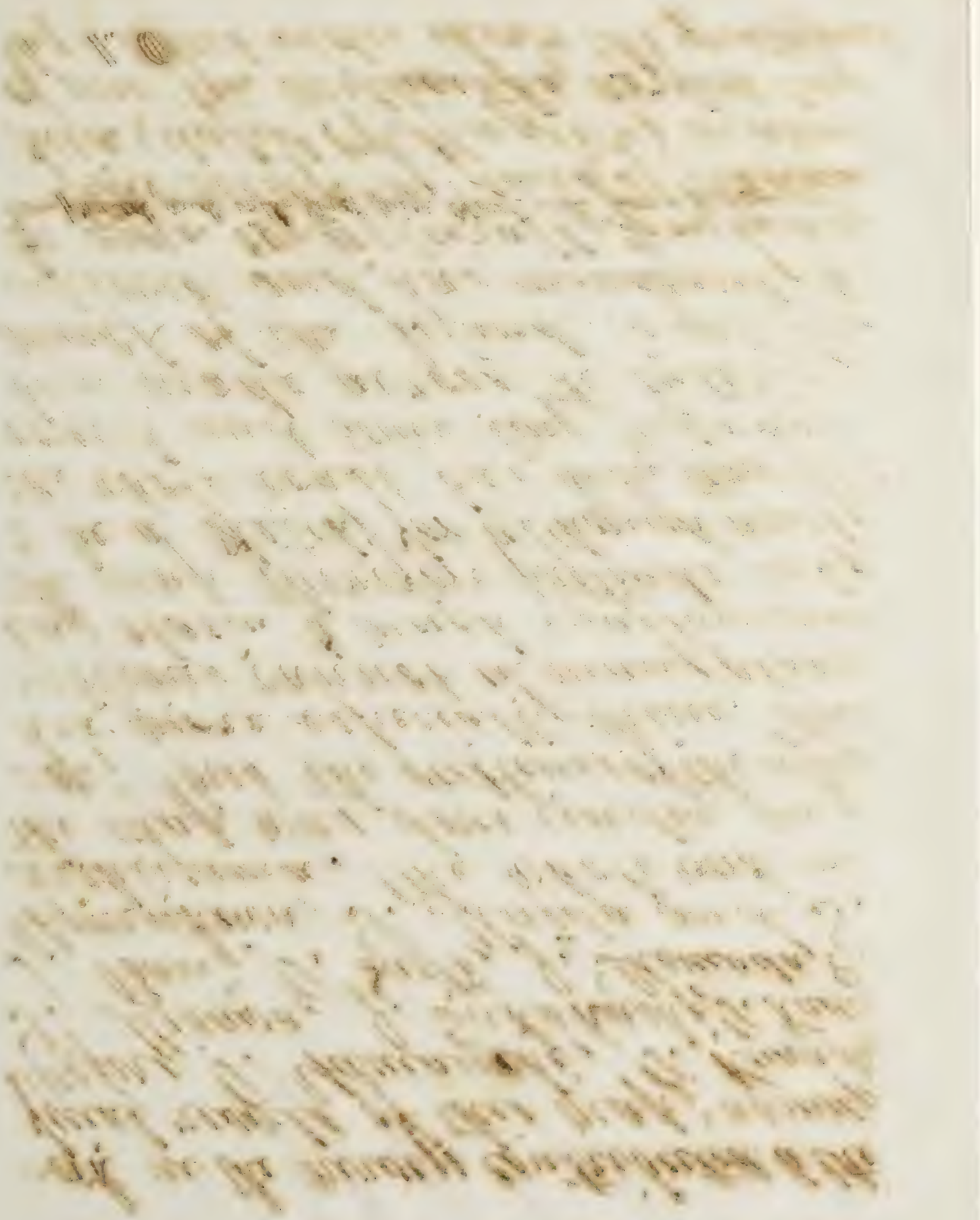
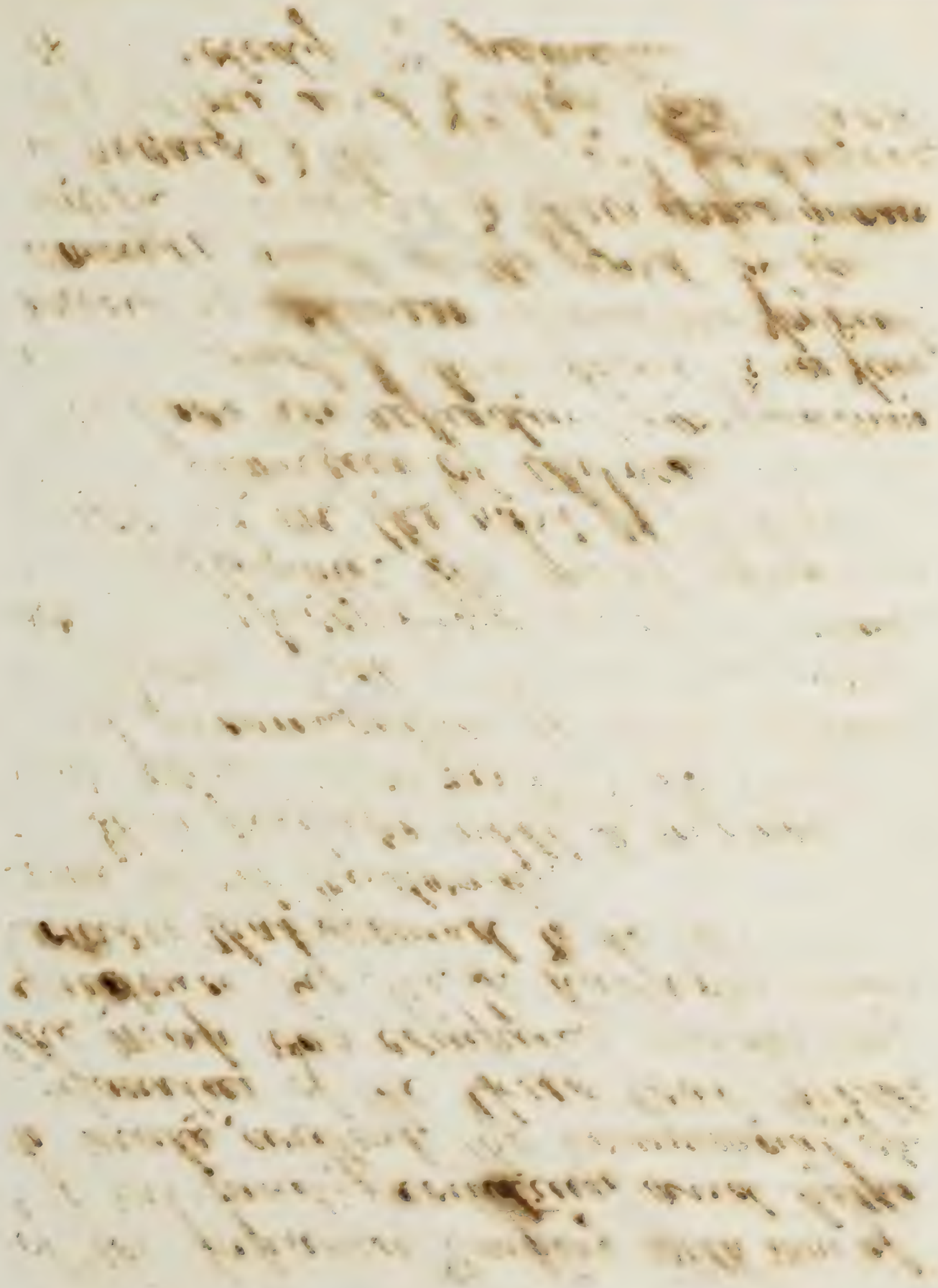


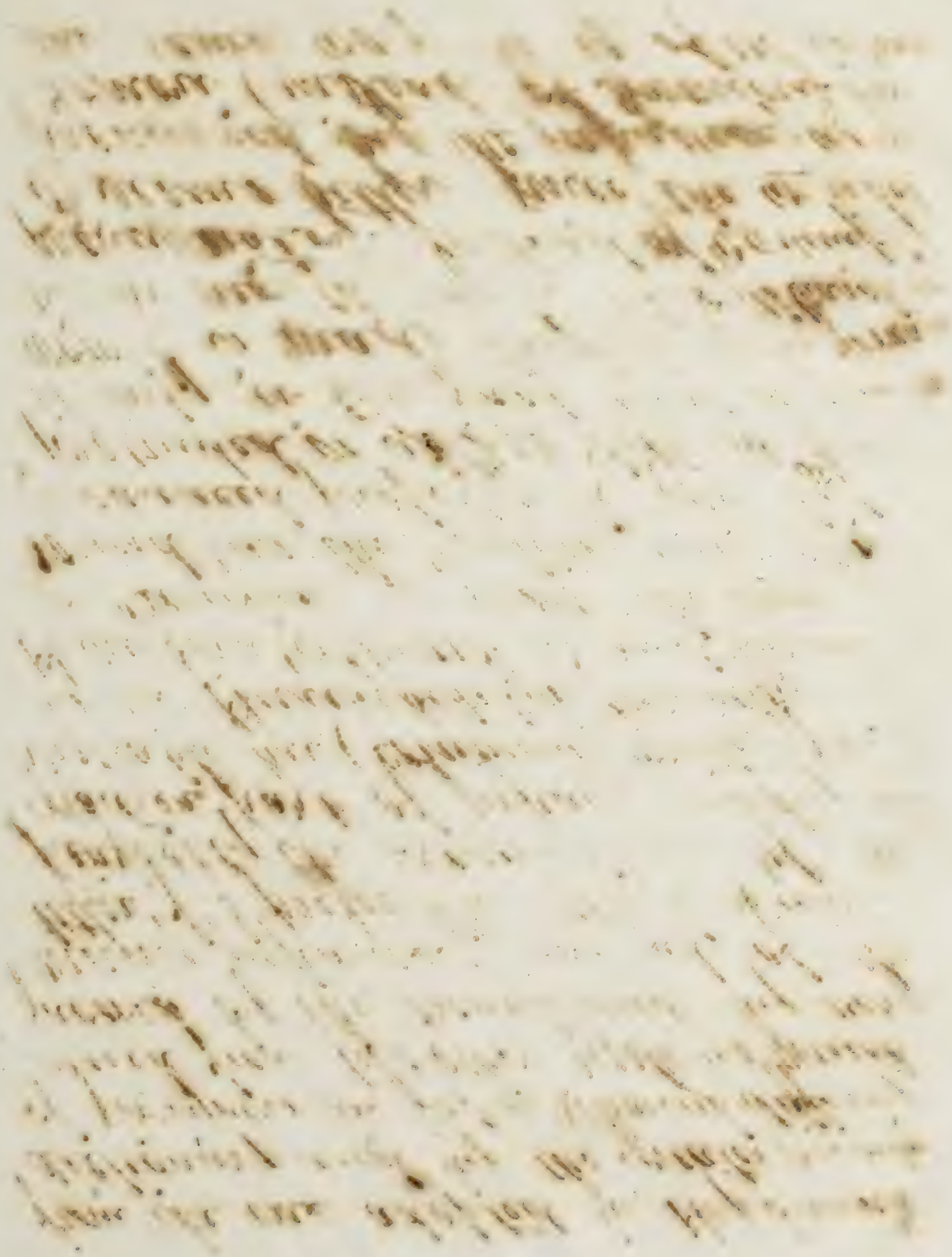


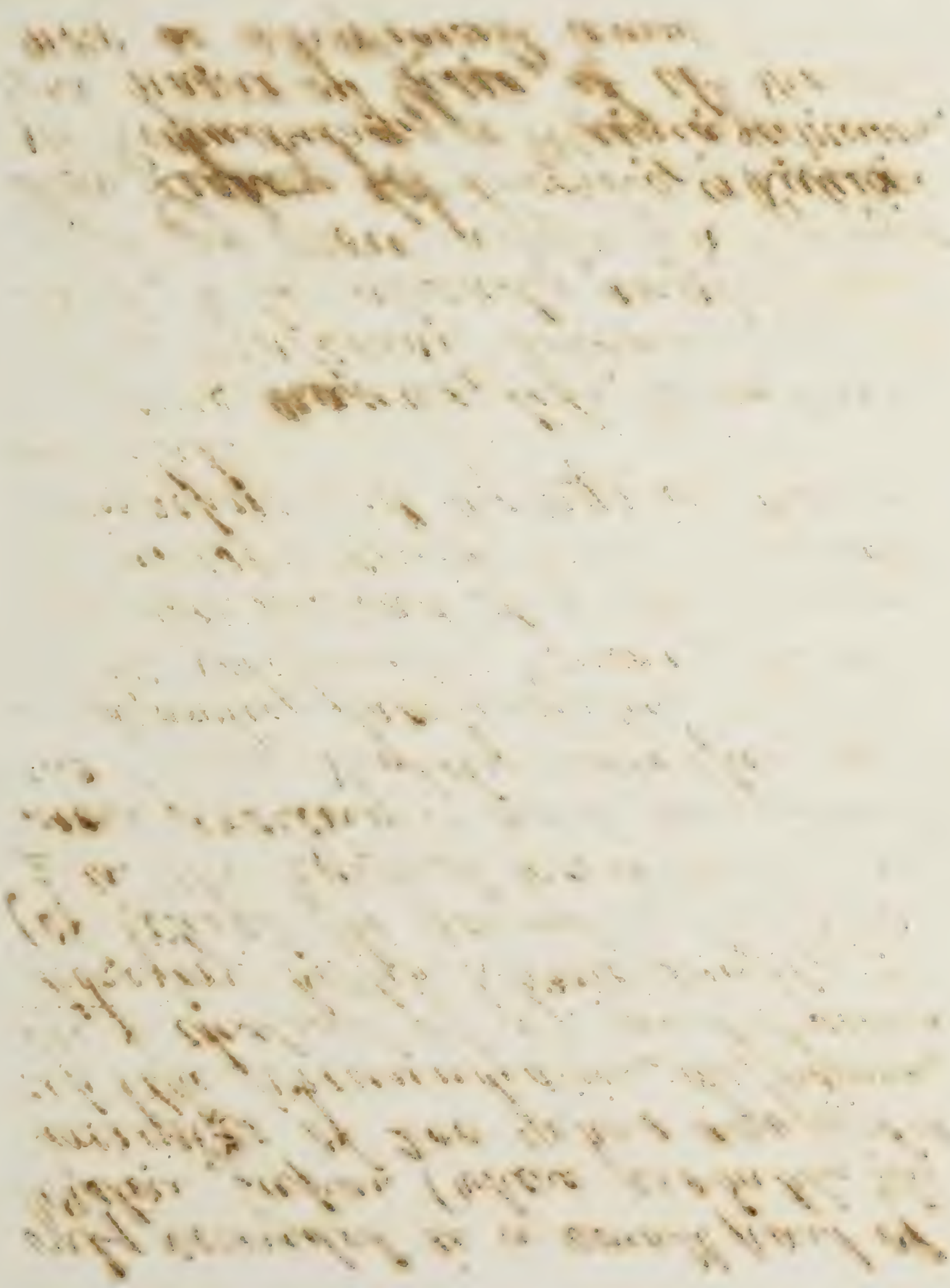


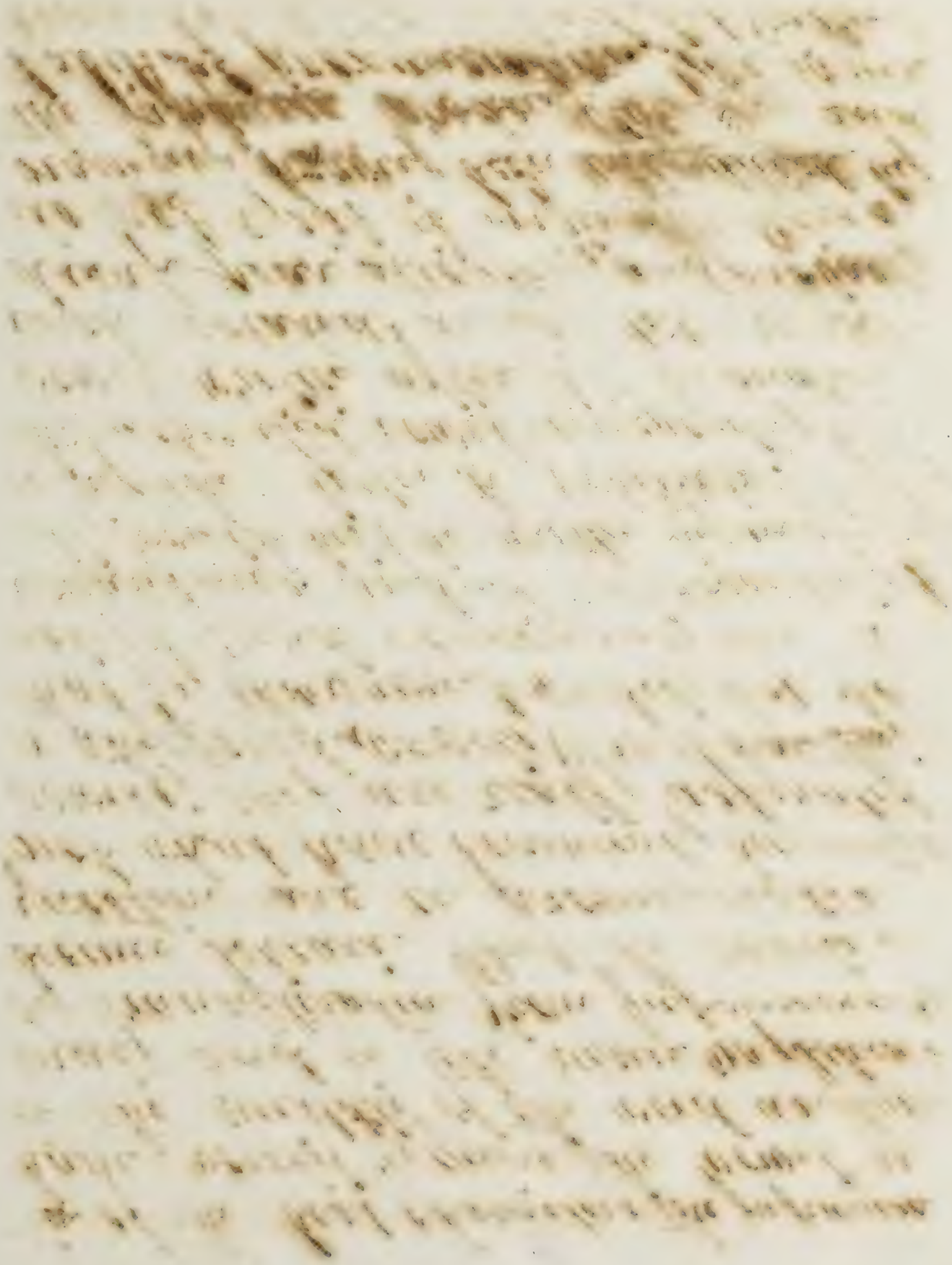


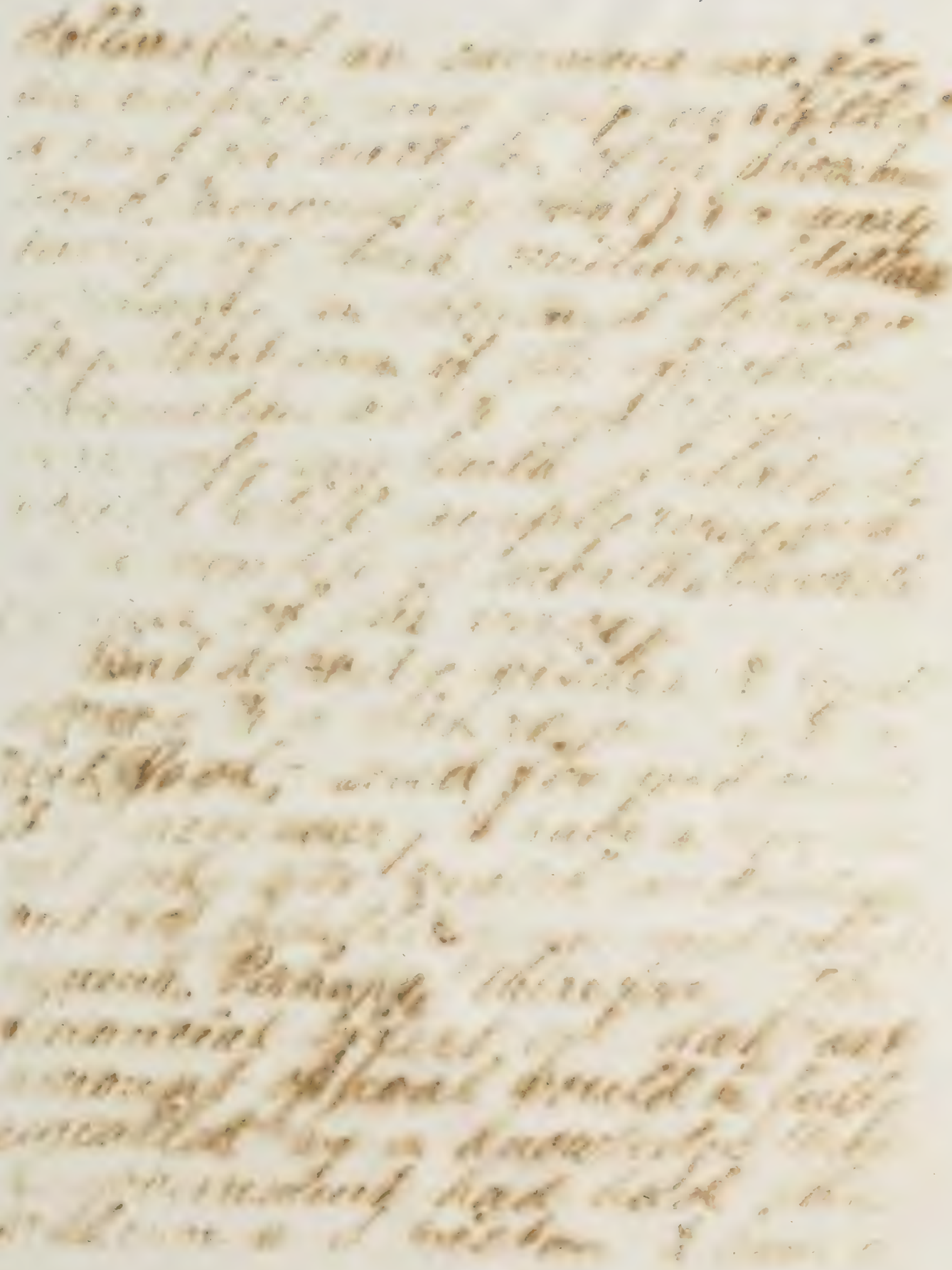


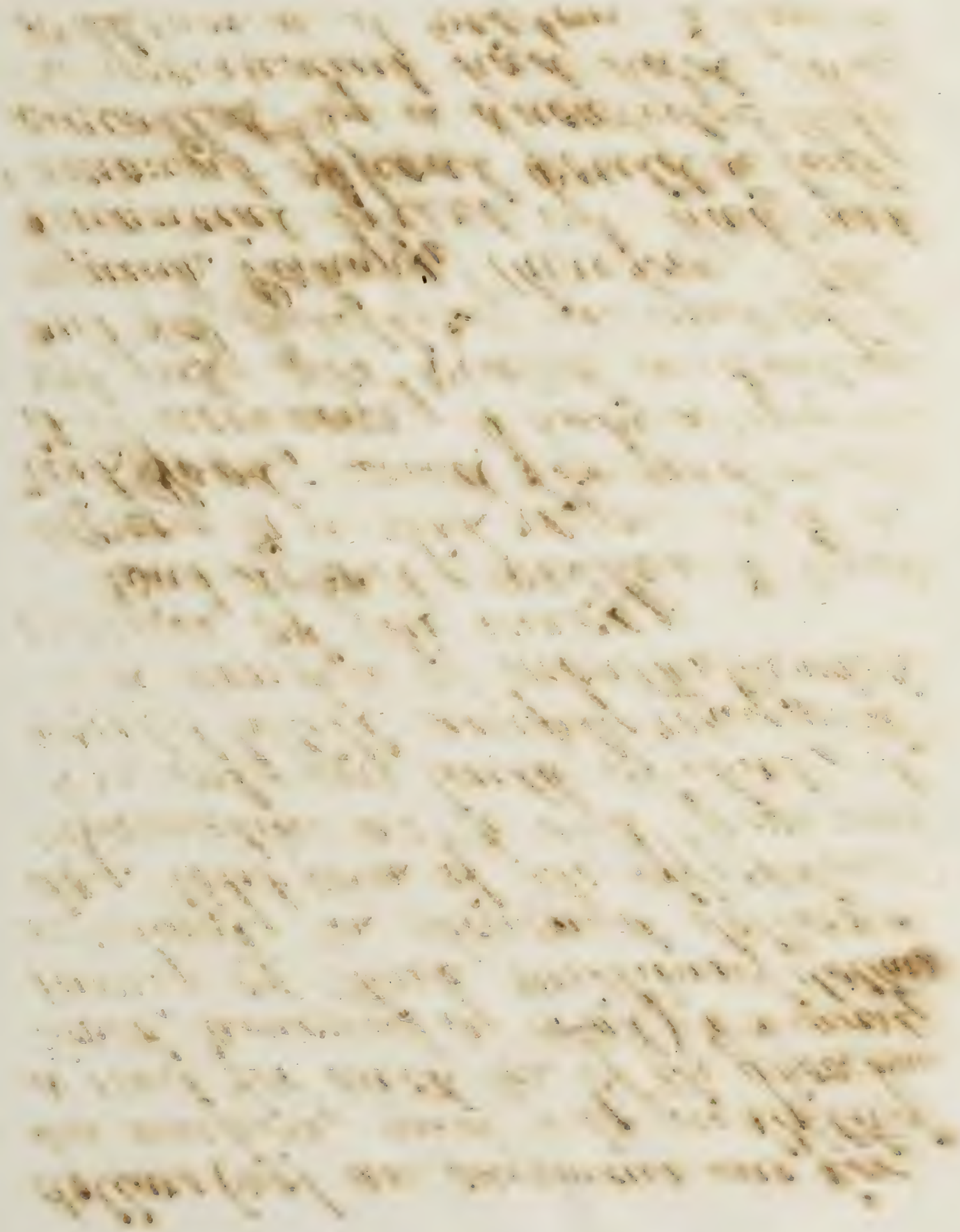








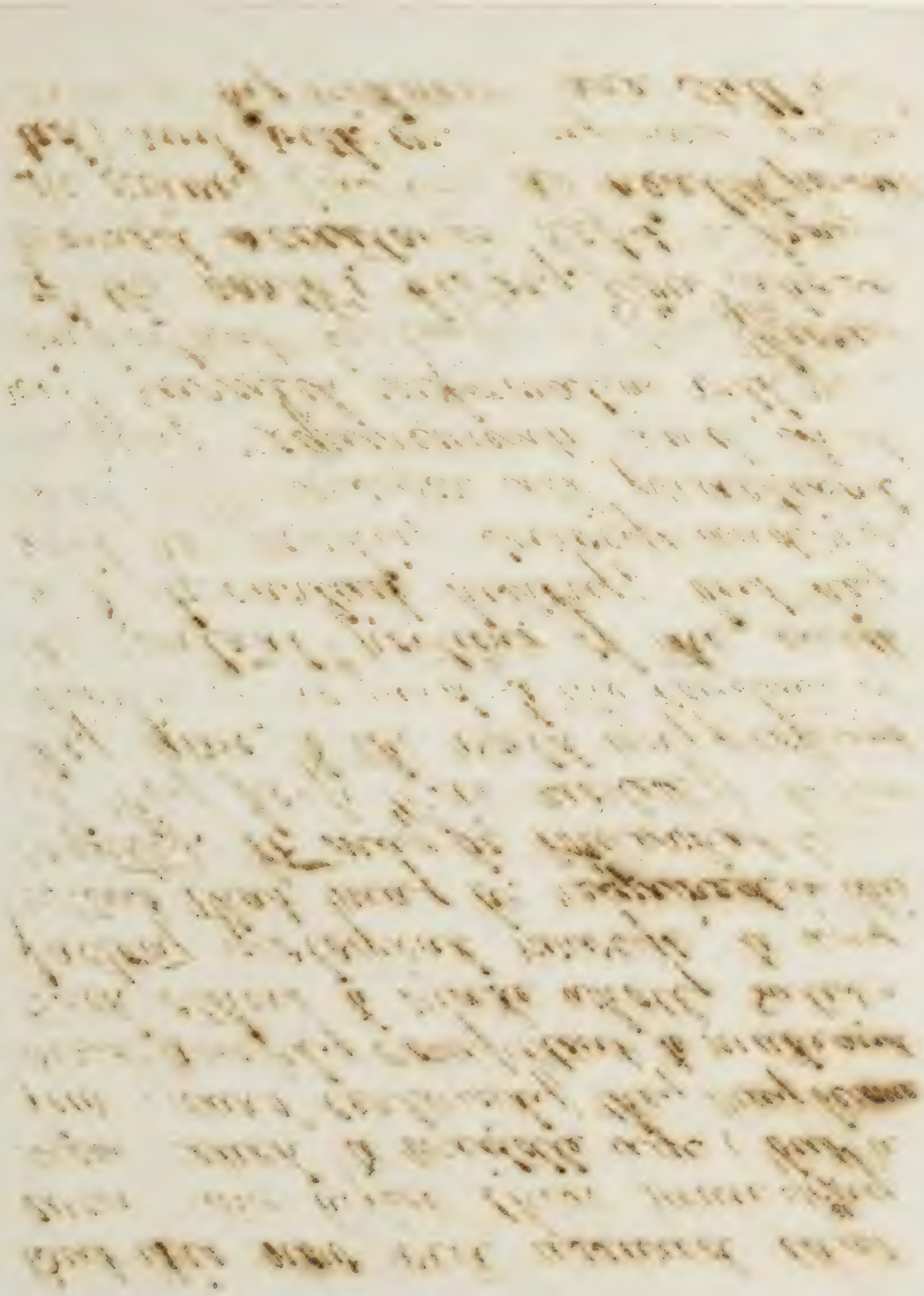


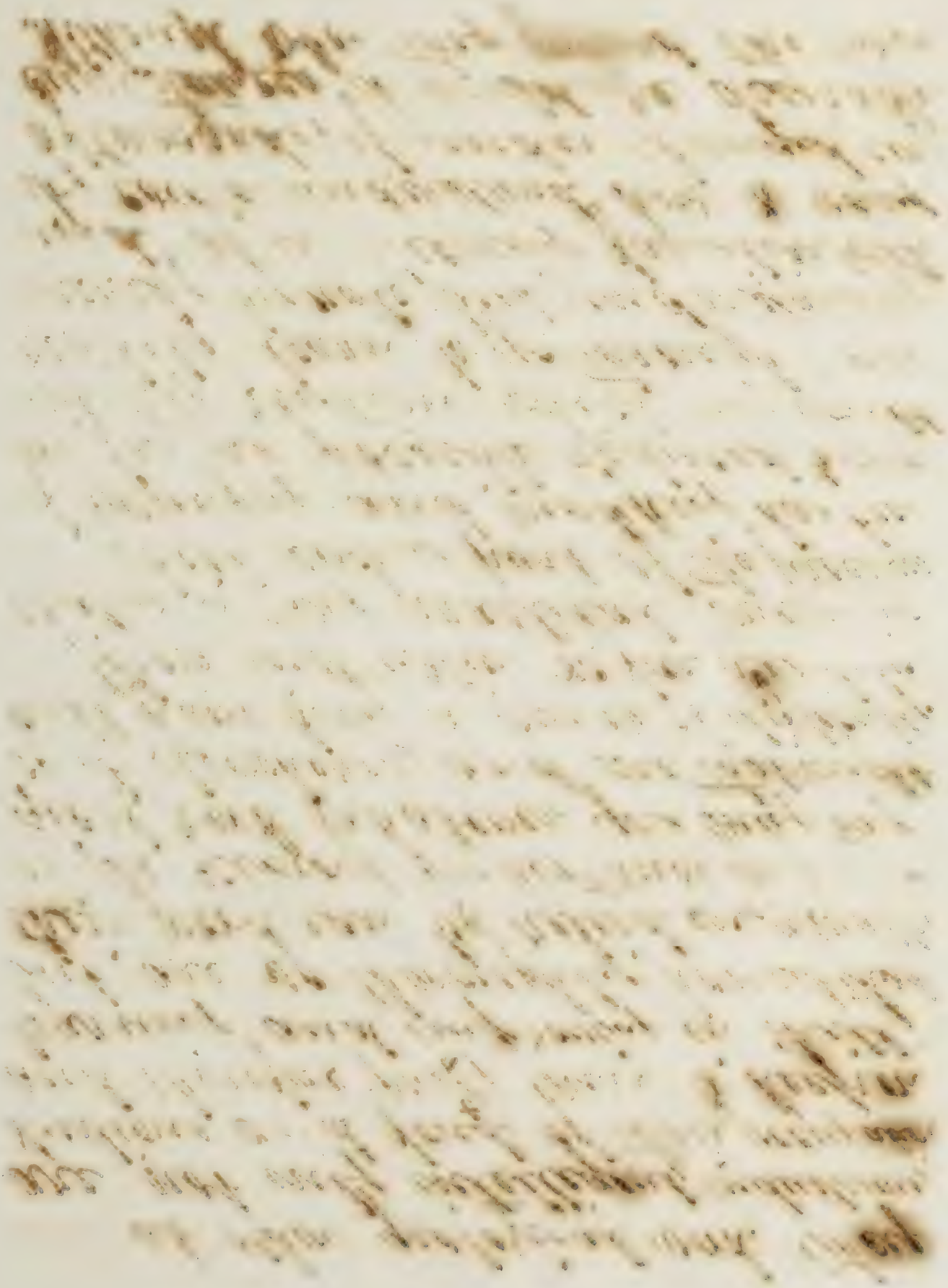


to completion the first geological survey of the kind undertaken by [illegible] British government, and of publishing the results of the application [illegible] for the benefit of the [illegible] for the better information of all who are [illegible] in geology.

The [illegible] trigonometrical survey begun by the recommendation of [illegible], and the [illegible] government, may [illegible] [illegible] property along the [illegible]

[illegible] geographical [illegible] the [illegible] of the phenomena [illegible] [illegible]





been done far more rapidly into [illegible] than it was [illegible] twenty years, it is not easy to say that any other survey would have accomplished its entire [illegible].

The following is a list of [illegible] issued [illegible] of this date, [illegible] (photographical):

a. A map of [illegible] 2.63 by 1.97 feet, [illegible] [illegible] [illegible] [illegible] for the use of the [illegible]

b. Chattanooga [illegible] dated [illegible] 4.54 feet. Scale [illegible]

c. [illegible] 1872; 0.70x0.48, [illegible]

d. [illegible] April, 1873, 1.12x1.12, $\frac{1}{5000}$.

e. [illegible] April 1876; [illegible]:24 [illegible].

f. [illegible] 1875; 1.11x0.97; [illegible].

g. Washimoki Oil Lands, 3 June 1875; 2.98 x 1.84; $\frac{1}{5000}$.

h. [illegible] Oil Field; 17 July 1875; 2.83 x [illegible]; $\frac{1}{5000}$.

i. [illegible] of the Poronai [illegible] Horomanai Rail Road, [illegible] 24 [illegible] 1875; [illegible] x [illegible]; $\frac{1}{5000}$.

j. [illegible] and [illegible], 29 March 1876; [illegible] x [illegible]; $\frac{1}{5000}$.

k. Poronai and Horomanai Rail Road [illegible] [illegible] April 1876; [illegible]

l. [illegible] April, 1876; [illegible] x [illegible]; [illegible].

m. [illegible] from the [illegible] of [illegible], [illegible] May [illegible]; [illegible]; $\frac{1}{5000}$.

n. Geological [illegible] map of [illegible] (in colors) 10 May 1876; [illegible]; $\frac{1}{5000}$ [illegible].

o. Poronai Coal Field [illegible] [illegible] [illegible] section, 10 May 1876; 2.91 x 2.31; $\frac{1}{5000}$.

p. [illegible] Coal Field; 13 [illegible] [illegible]; $\frac{1}{5000}$.

9. [illegible] 1876. 3,34 x 3,32.

10. [illegible] 1876. 3,30 x 3,40. 500.

11. [illegible] 1876. 1000.

12. [illegible] 1876. 1000.

13. [illegible] 1876. 1000.

[illegible]

k. Geological notes (by Mr. [illegible]) 29 Jan, 1876; pp. 52 and pp. 47 of copies,

l. [illegible] and [illegible] coal survey, 12 April, 1876; pp. 4.

m. [illegible] coal survey, [illegible] 1876, pp.

n. [illegible] coal survey, 1876; pp.

o. [illegible] coal survey, 1876,

p. [illegible] coal survey, 1876, pp.

q. [illegible] survey, 1876, pp.

r. [illegible] 1876; pp.

It appears, [illegible] each map [illegible] [illegible] the [illegible] part of which [illegible] [illegible] would [illegible] [illegible] compilation [illegible] [illegible] [illegible] in addition, [illegible] into the final map [illegible] [illegible]

STP

[illegible] 00

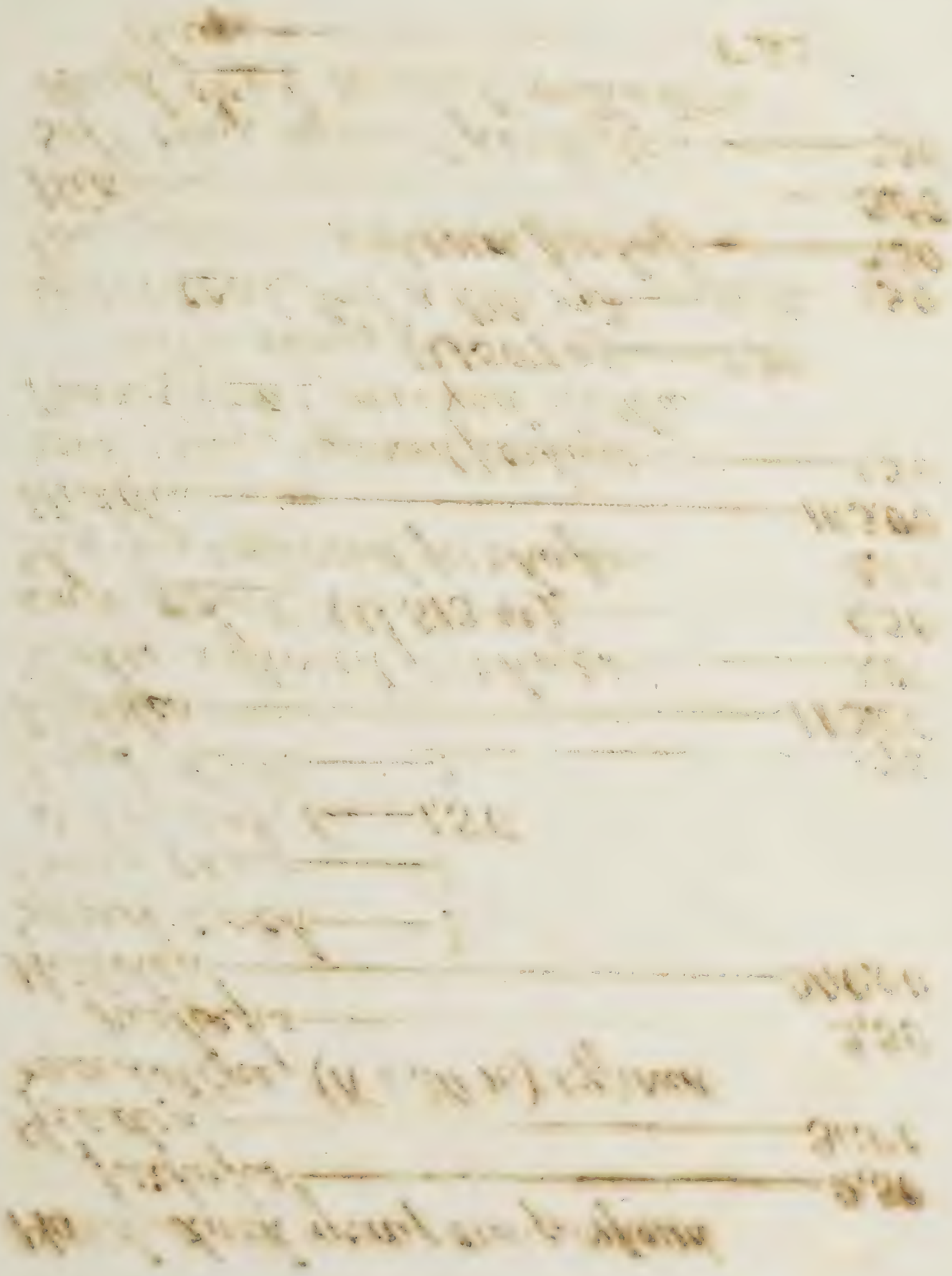
[illegible] 3[illegible]

[illegible] [illegible]

[illegible] 700

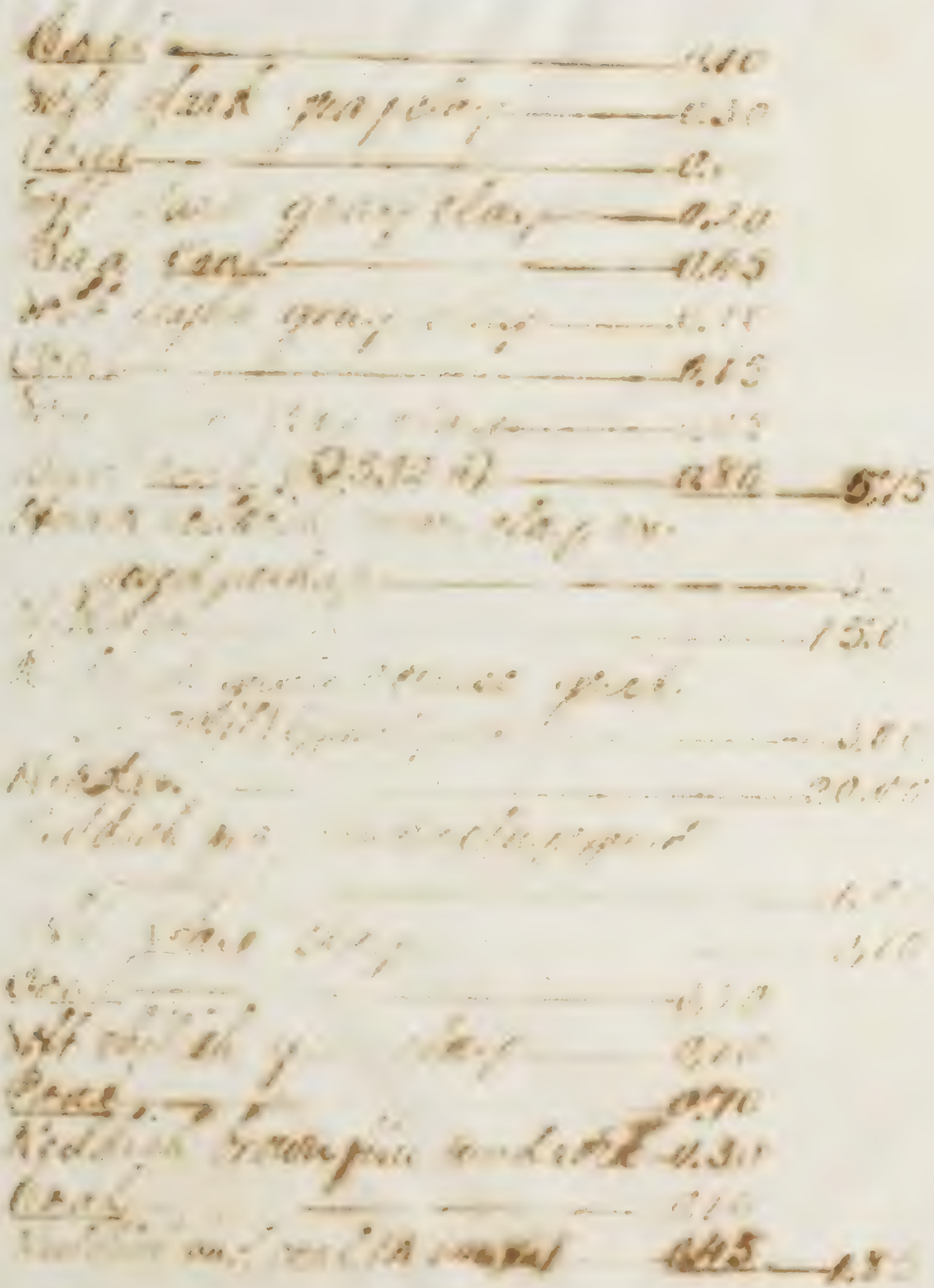
[illegible] 700

Bluish gray sandstone weathering



[illegible] [illegible]

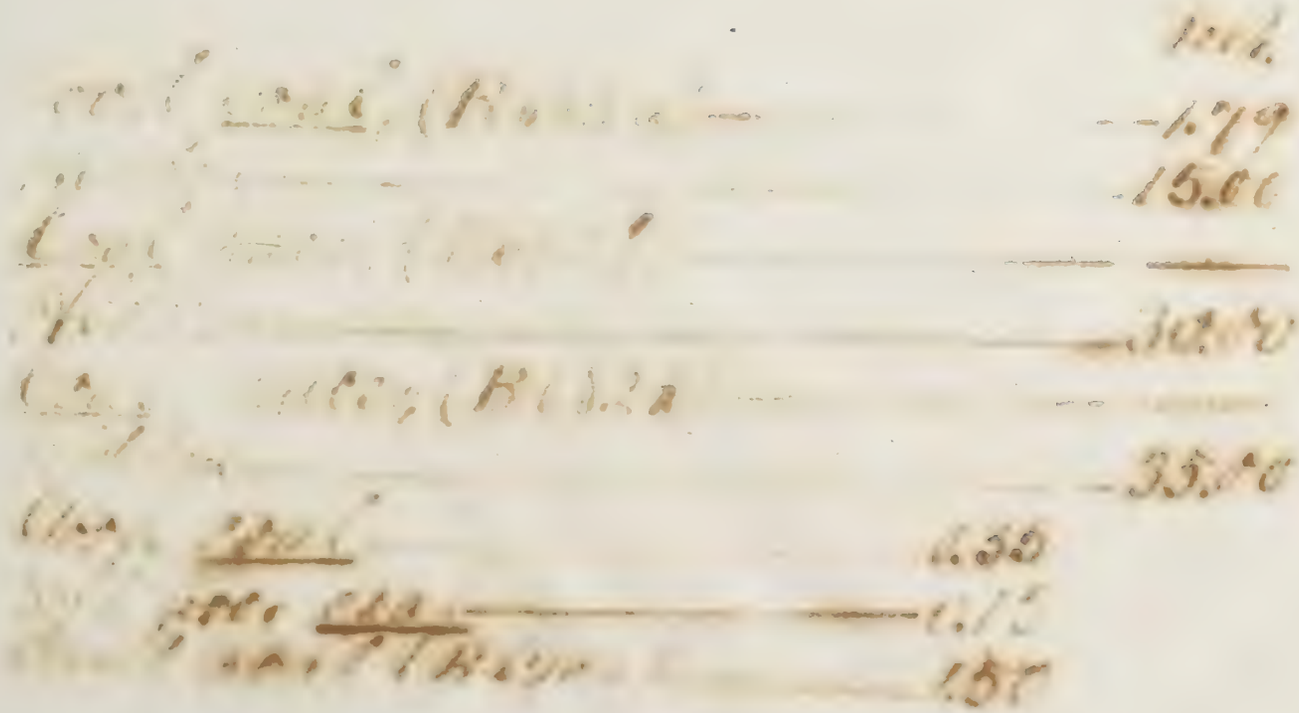
[illegible]	0.20	
[illegible] (U507 ?)	[illegible]	1.25
[illegible]		2.00
[illegible]		180.00
[illegible] (E408 [illegible])		0.30
[illegible]		[illegible]
[illegible]		32.00
[illegible]	0.25	
[illegible]	0.15	
[illegible] (B 30) [illegible]	0.35	0.75
[illegible]		[illegible]
[illegible]		30.00
[illegible]		2.00
[illegible]		2.00
[illegible]	0.00	
[illegible]	0.10	
[illegible]	0.10	
[illegible]	0.30	
[illegible]	0.15	
[illegible]	0.20	
[illegible]	0.10	
[illegible]	0.30	
[illegible]	0.50	

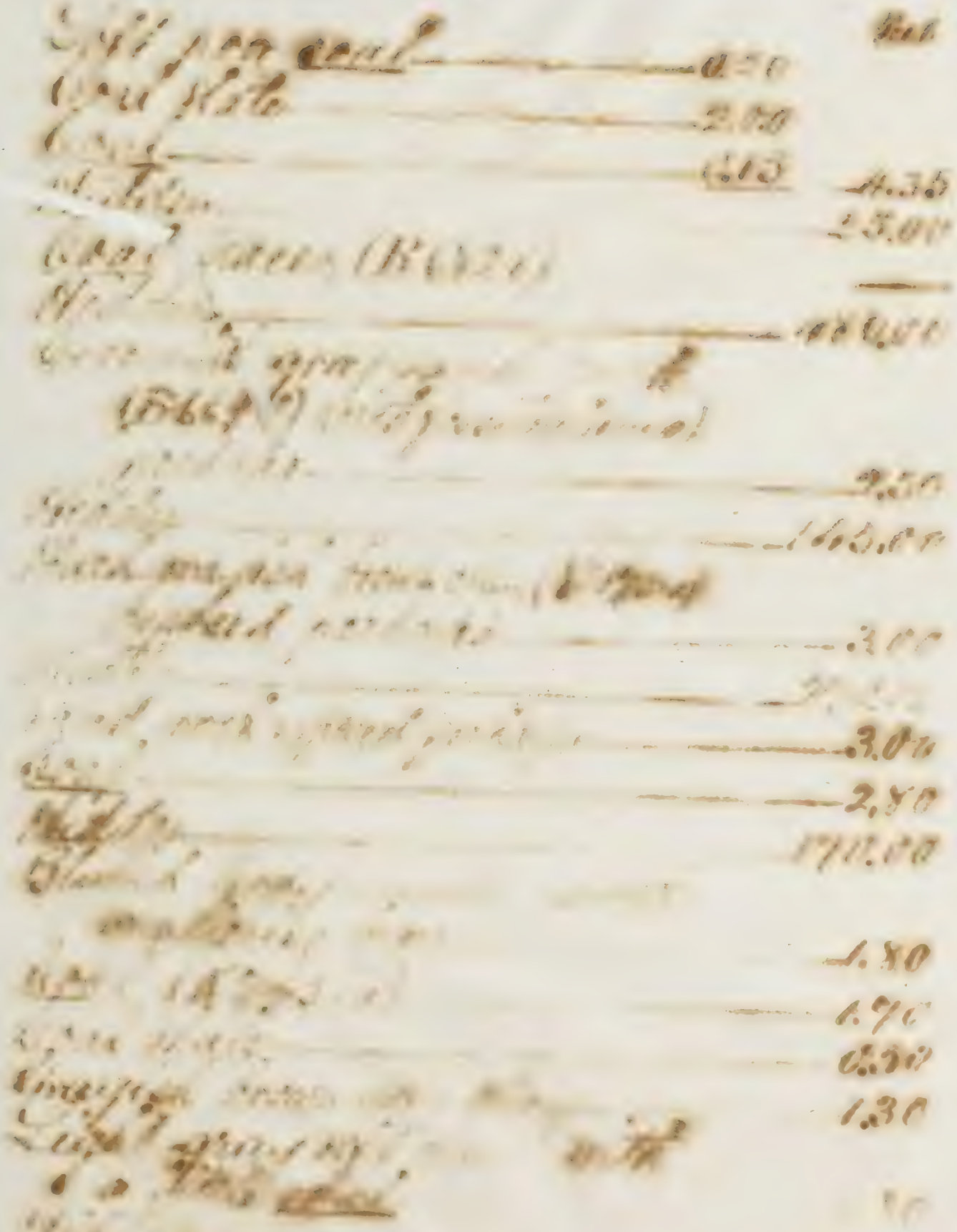


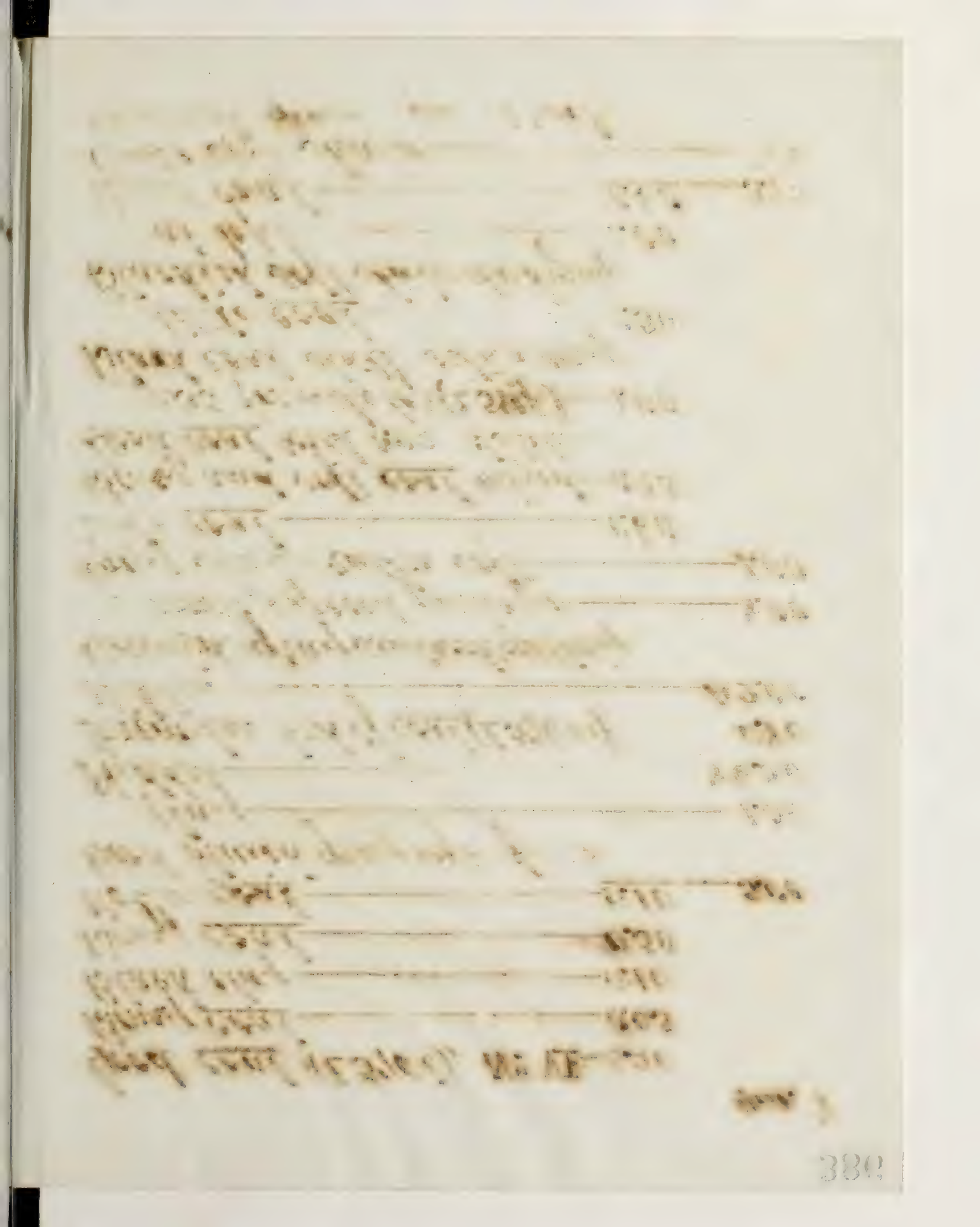
[illegible]

[illegible] ——— [illegible]
[illegible] ——— 2.50
[illegible] ——— 2.10
[illegible] ——— 0.30
[illegible] ——— 3.00
[illegible] ——— 30.00
[illegible] ——— 3.00

30.60







containing [illegible] read ——— [illegible]

[illegible] ——— 3.00

[illegible] ——— 1.50

[illegible] (1.60 [illegible]) [illegible] ——— [illegible]

[illegible] ——— 73.00

[illegible] ——— [illegible]

[illegible] ——— [illegible]

[illegible] ——— [illegible]

[illegible] ——— 13.00

[illegible] in the [illegible]

[illegible] ——— [illegible]

[illegible] ——— [illegible]

[illegible] ——— [illegible]

[illegible] ——— [illegible]

[illegible] ——— 1.40

[illegible] ——— [illegible]

[illegible] ——— 1.30

[illegible] ——— 13.50

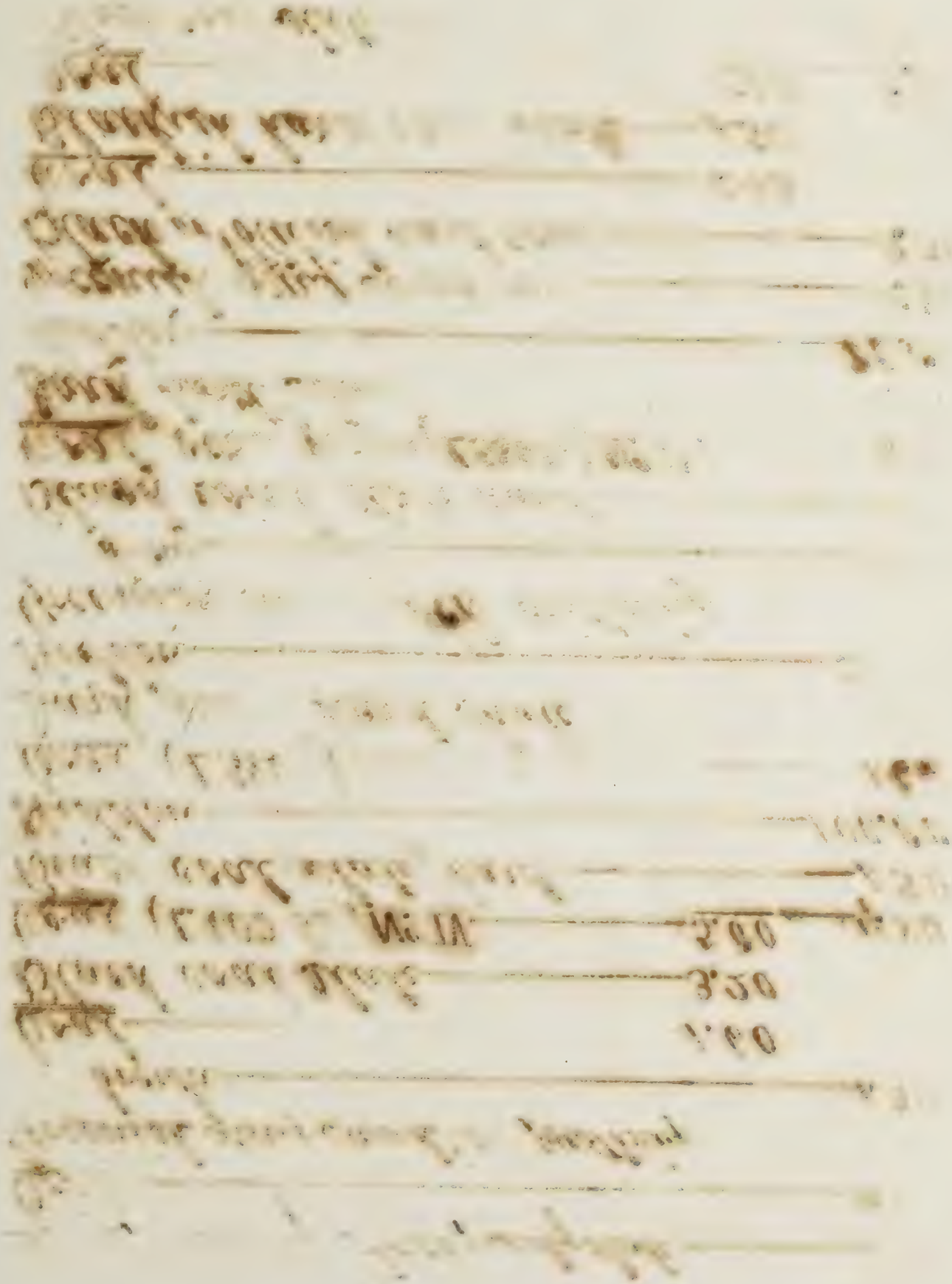
[illegible]

[illegible] ——— [illegible]

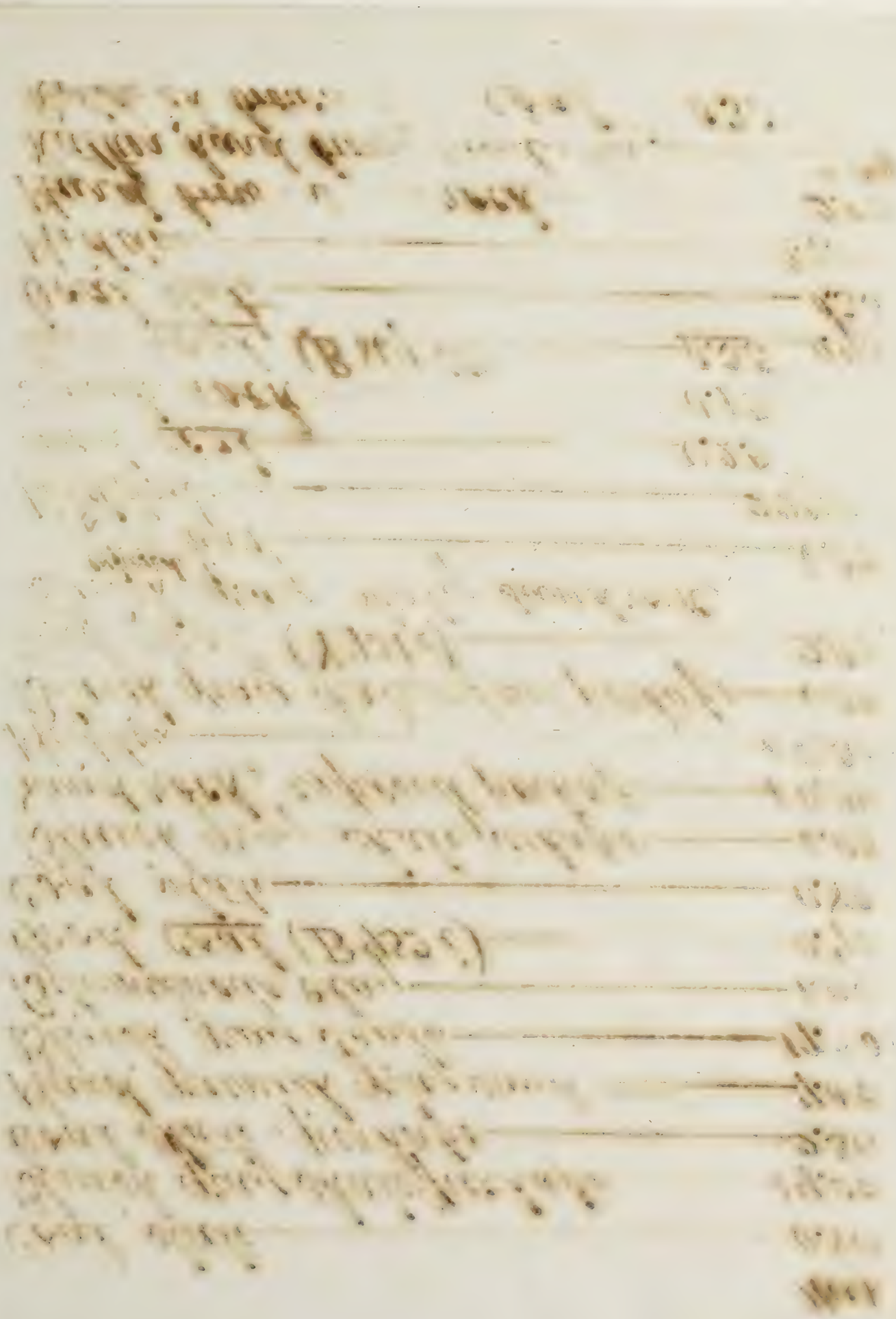
1.60

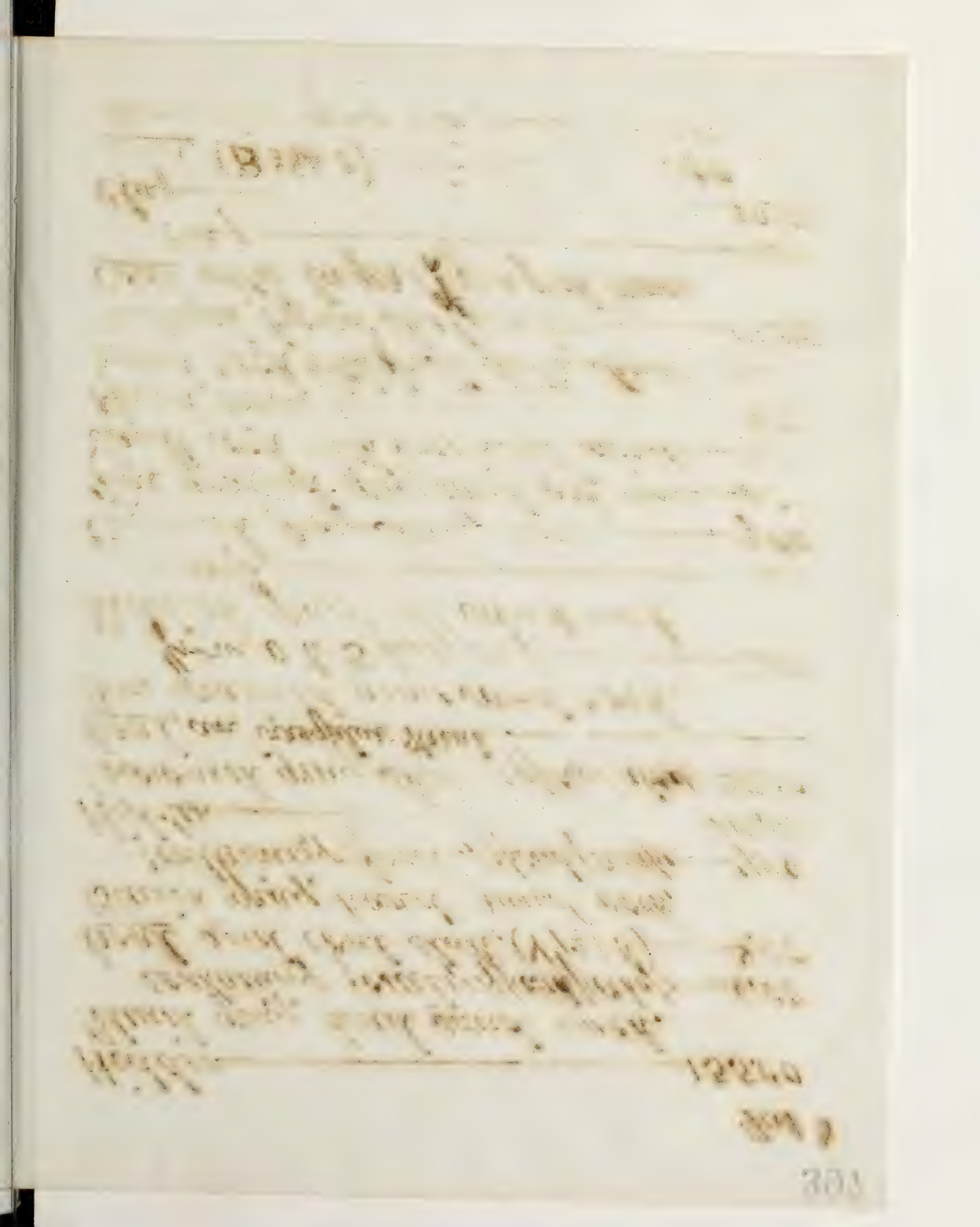
3.20

No. IV. 5.00



		[illegible]
Dark gray [illegible]		[illegible]
Black cloth, [illegible]		0.30
Reddy [illegible]		[illegible]
Vest (L[illegible]) N[illegible]	2.00	
Dark blackish coat [illegible]	1.[illegible]	
[illegible]	[illegible]	
Black coat [illegible]	.30	
Coat	[illegible]	
[illegible]	[illegible]	
Coat [illegible]	6.05	
[illegible] coat [illegible]		
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		
[illegible]		
		[illegible]

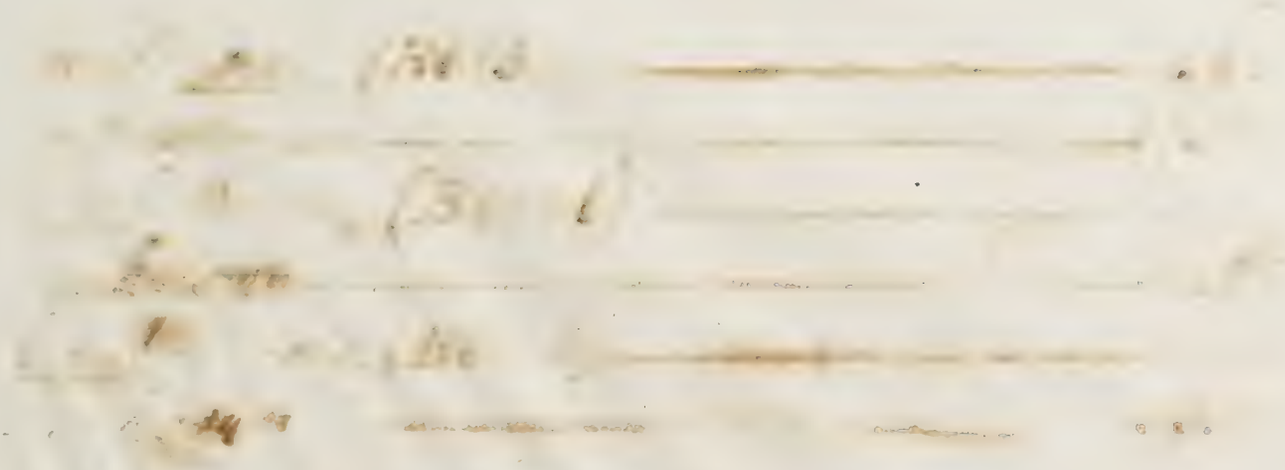


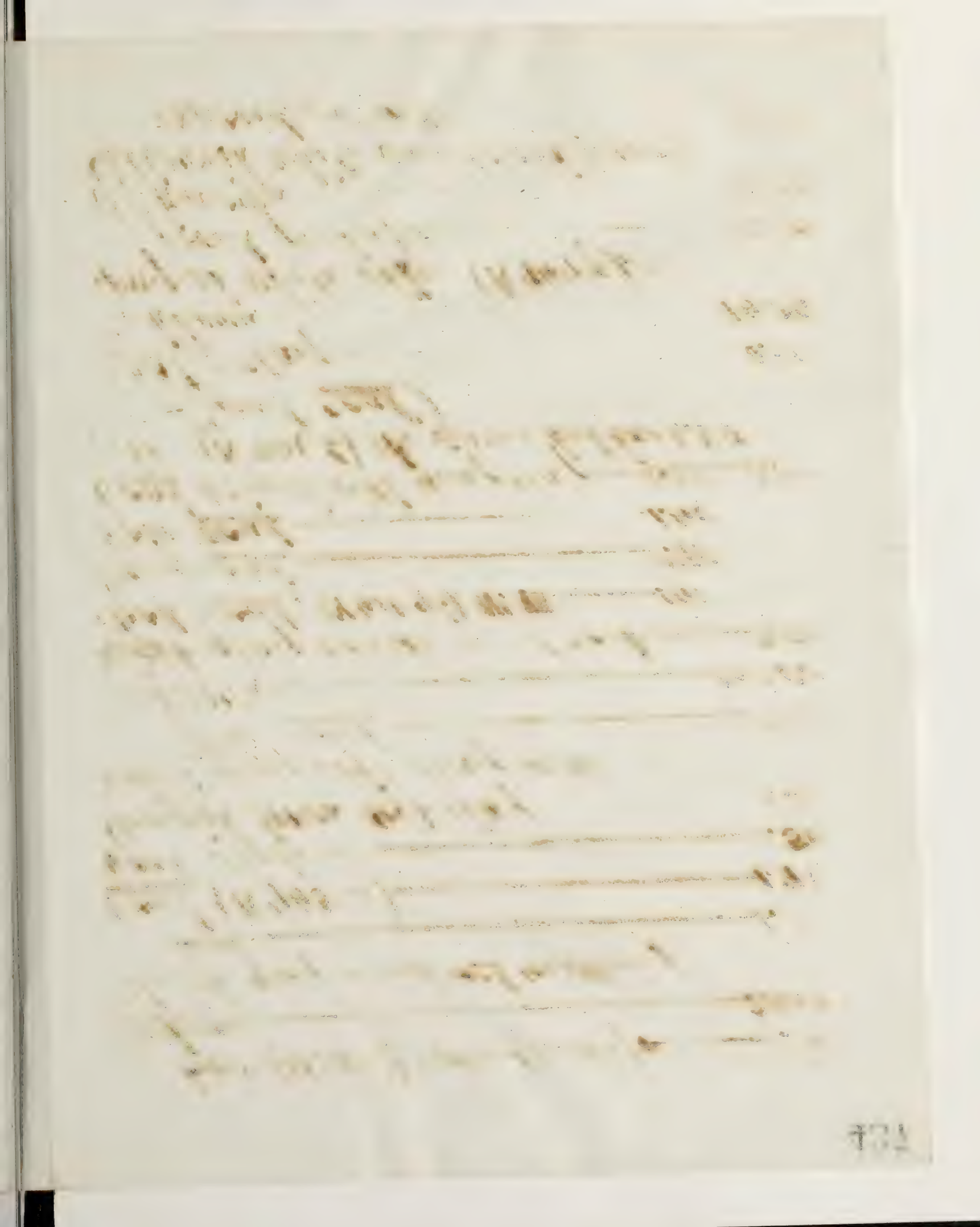


(U533K)

Hidden ——— 32.00
Greenish gray shales, exposed perhaps ——— 4.50
Good coal (U532 d) ——— 0.80
Greenish gray shale, exposed perhaps ——— 4.50
Hidden ——— 15.00
Soft clay, exposed perhaps ——— 1.50
Good coal ——— 0.50
Coal slate ——— 0.80
coal (U532 c) ——— 1.10
Coal shale, exposed perhaps ——— 1.00
Soft clay, exposed perhaps ——— 1.00
Good coal (U532 b) ———
Clay, shales, exposed perhaps ———
in ———
exposed clay shale ——— 5.00
[illegible] ———
[illegible] ———
[illegible] gray [illegible] rock
[illegible] ——— 2.50
[illegible] ———
exposed, perhaps ——— 2.00
Hidden ——— 66.00
[illegible]

B.4





Light gray clay shale, upland 0.50

Brown, weathered shale, upland

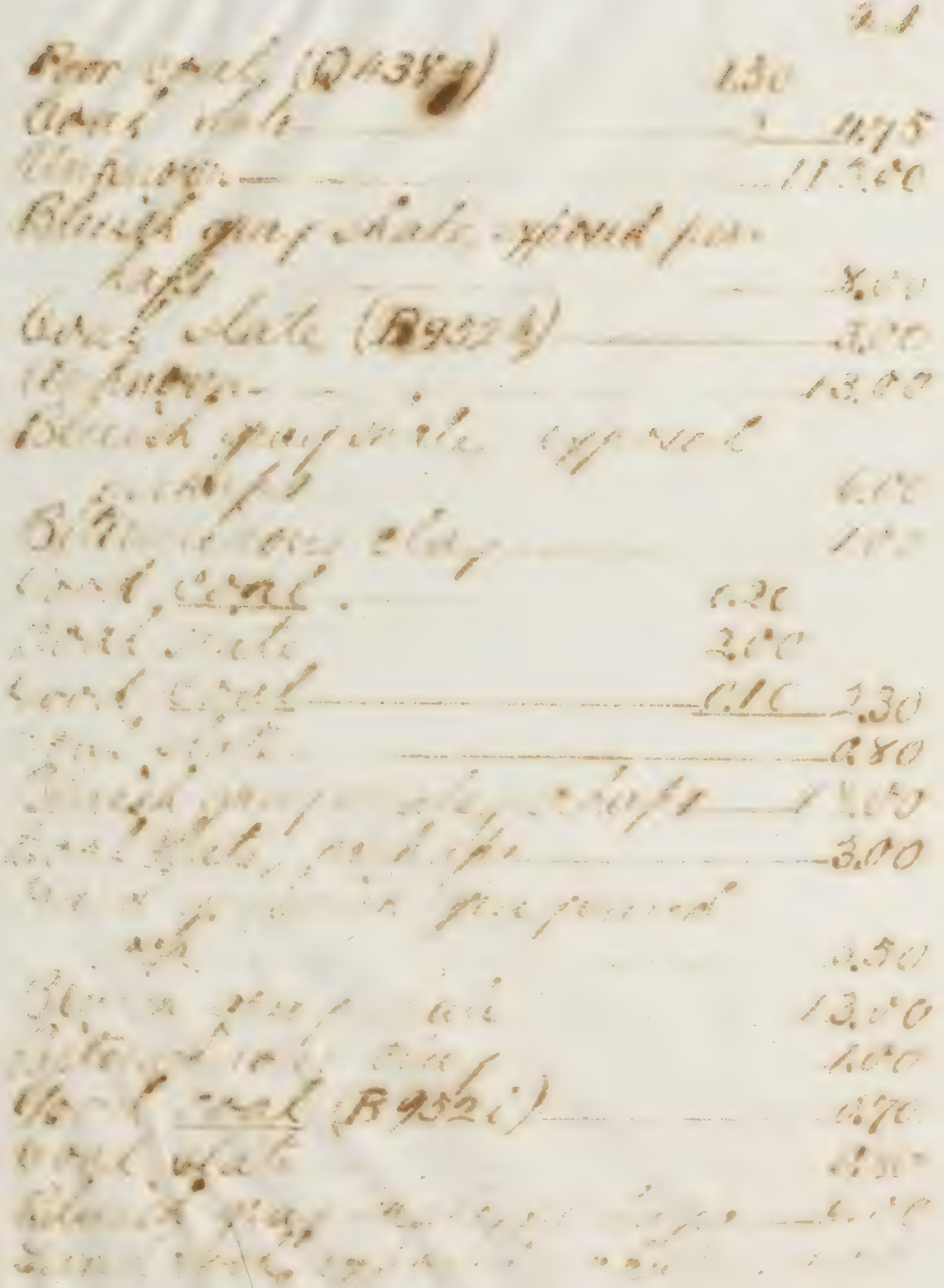
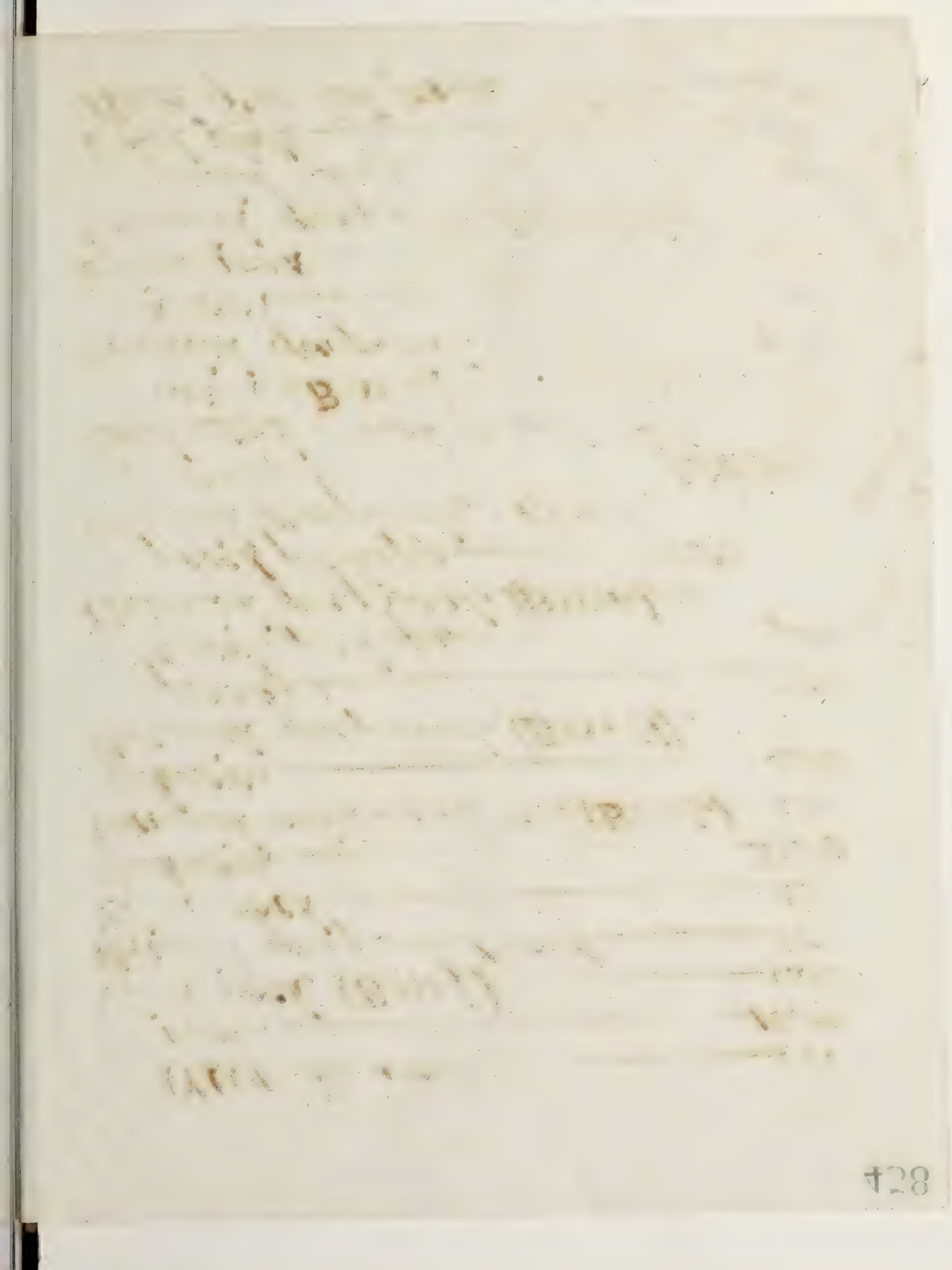
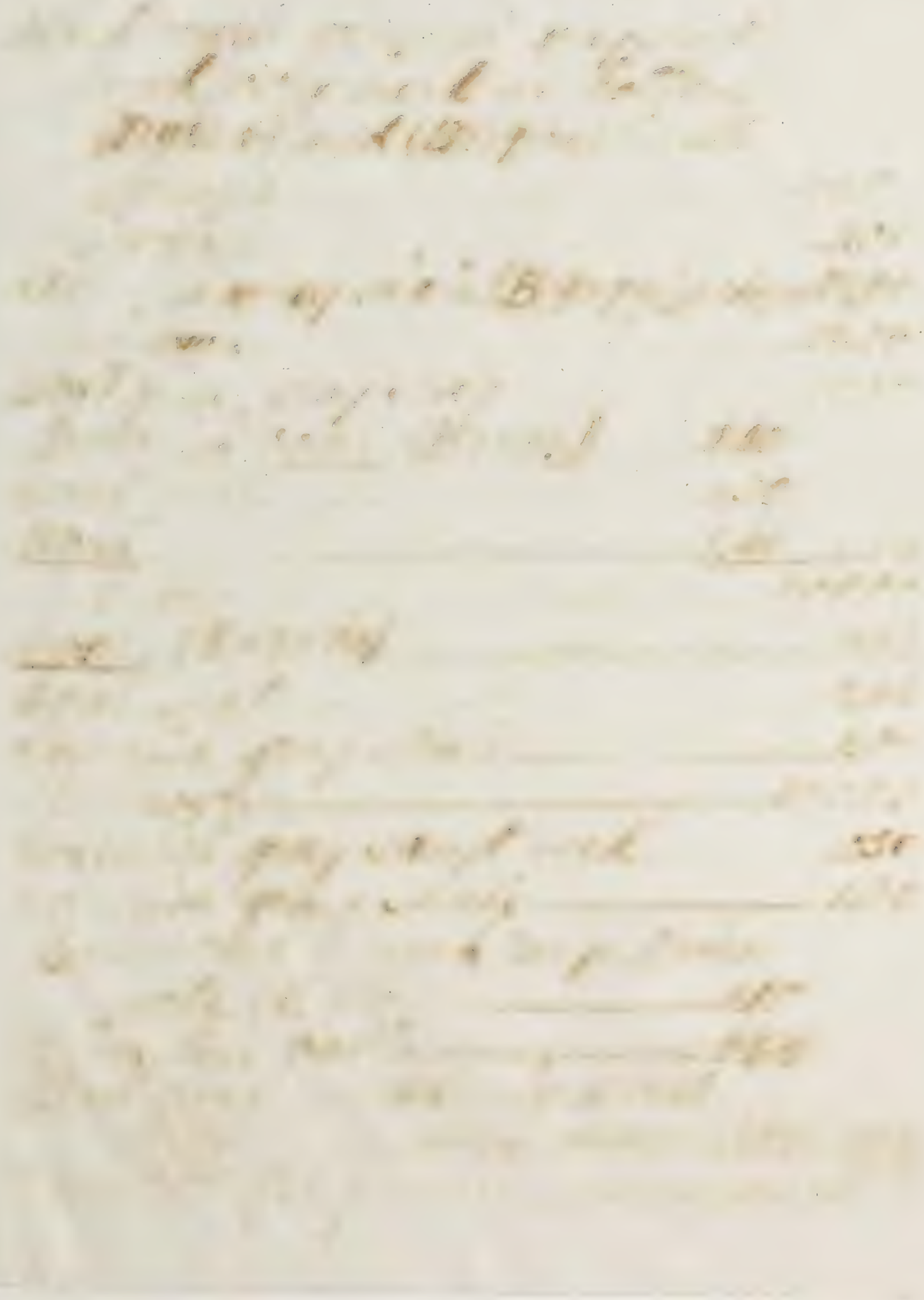
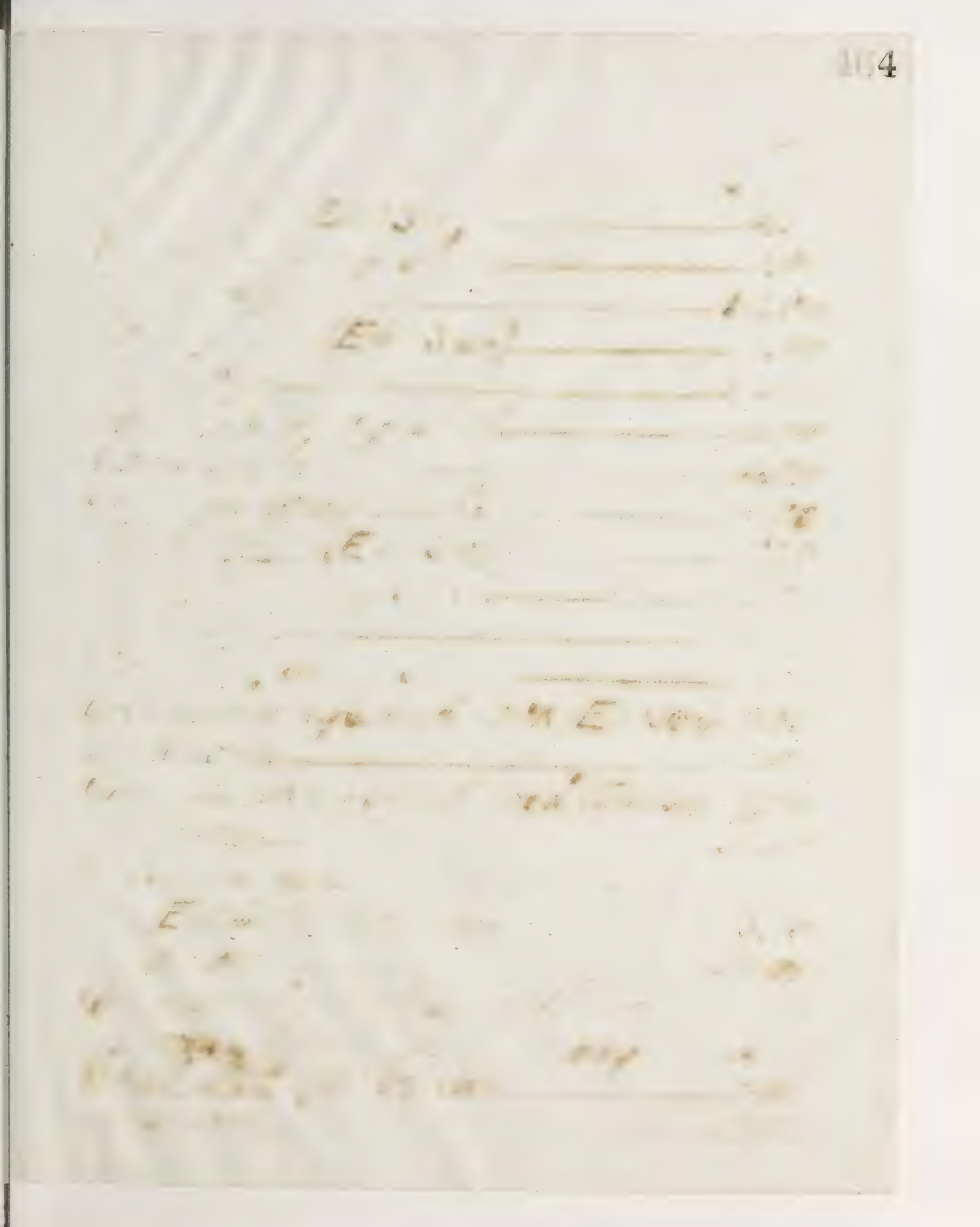
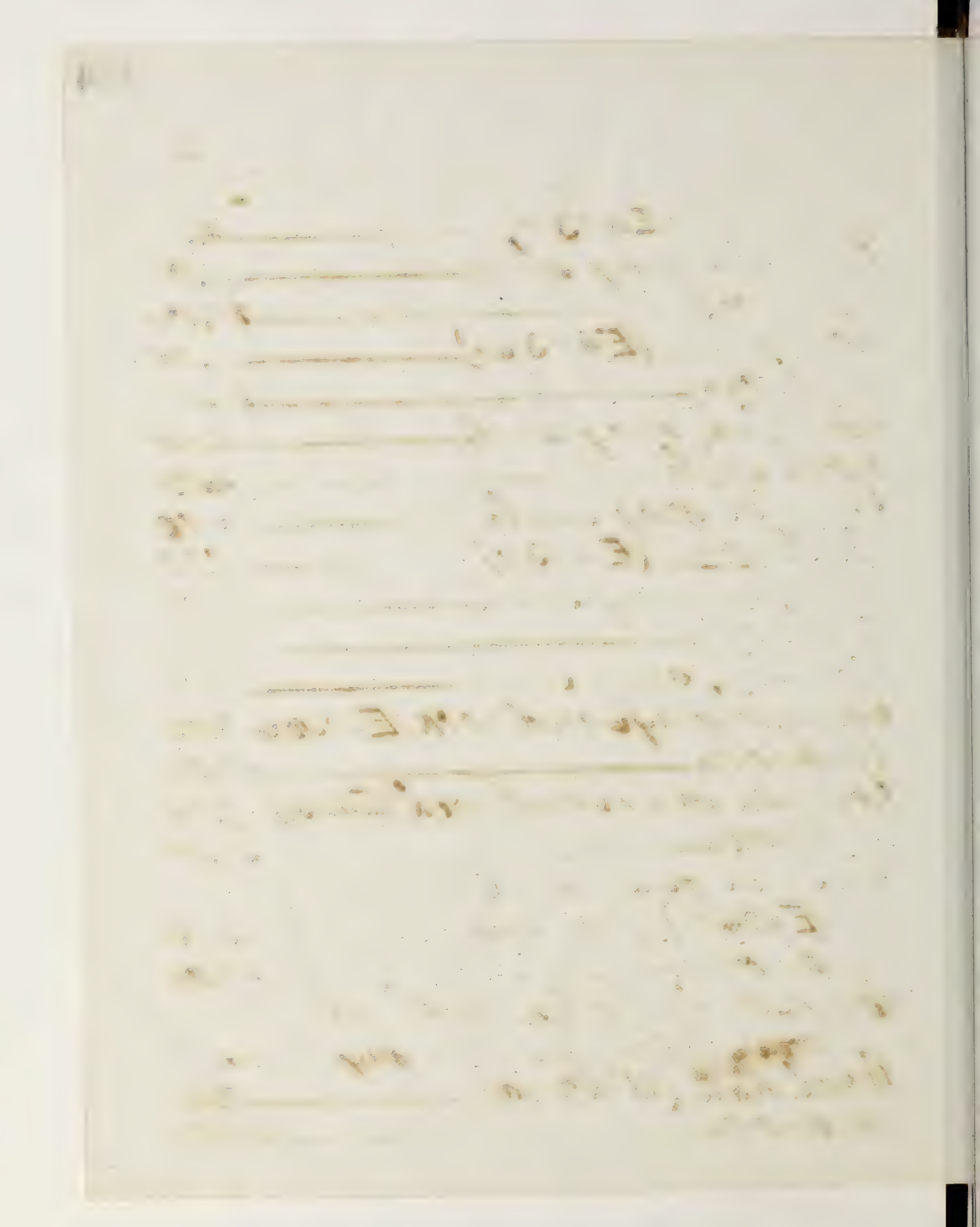



FIG. 4.